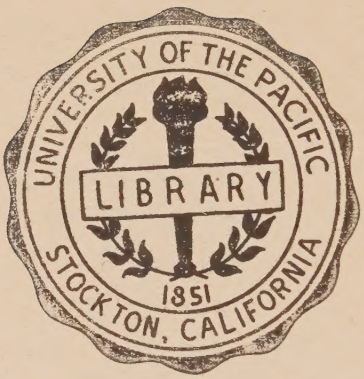
"LEST WE FORGET"

COMPLETE STORY OF THE SAN FRANCISCO HORROR

BY THE SURVIVORS AND RESCUERS

INTRODUCTION BY BISHOP FALLOWS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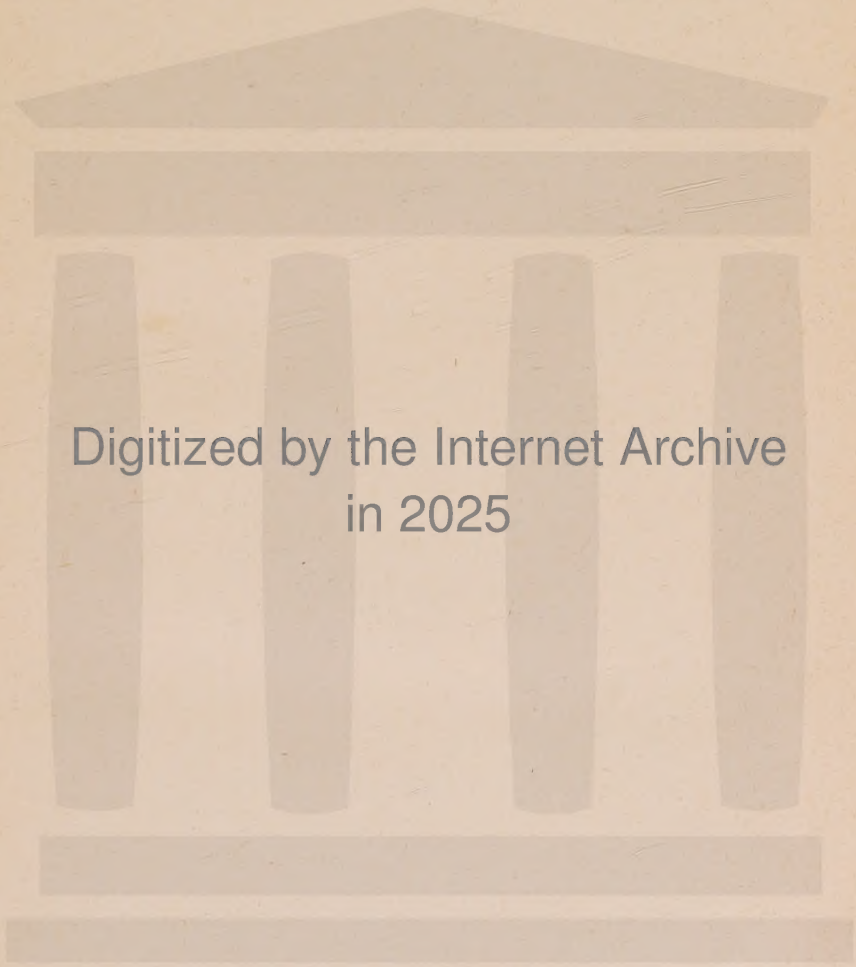

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PHELAN BUILDING. MUTUAL BUILDING. CALL BUILDING.

RUINS ON MARKET STREET. This picture shows how the modern steel constructed buildings withstood the earthquake, and though they were completely gutted by fire, they show man's ability to successfully cope with the elements.

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A GENERAL VIEW AFTER THE FIRE. Looking in any direction almost as far as the eye could see were ruins of handsome and substantial buildings, of which the above picture is a fair sample.

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COMPLETE STORY OF THE

San Francisco Horror

INTRODUCTION BY

RT. REV. SAMUEL FALLOWS, D. D., LL. D.

A Comprehensive and Connected Account of the Terrible Tragedy that Befell the People of Our Golden City—The Metropolis of the Golden Gate, and the Death and Ruin Dealt Many Adjacent Cities and Surrounding Country. Destroying Earthquake Comes Without Warning, in the Early Hours of the Morning; Immense Structures Topple and Crumble; Great Leland Stanford University Succumbs; Water Mains Demolished and Fire Completes Devastation; Fighting Fire With Dynamite.

SCENES OF DEATH AND TERROR

Thousands Killed, Maimed, or Unaccounted For; Tens of Thousands Without Food or Shelter; Martial Law Declared; Millions Donated for Relief; Congress Makes an Appropriation; Sympathetic Citizens Throughout the Land Untie Their Purse-Strings to Aid the Suffering and Destitute; Property Loss Hundreds of Millions; Appalling Stories by Eye Witnesses and Survivors; The Disaster as Viewed by Scientists, etc.

Comprising Also a Vivid Portrayal of the Recent Death-Dealing

ERUPTION OF MT. VESUVIUS

BY RICHARD LINTHICUM
of the Editorial Staff of the Chicago Chronicle.

Together with twelve descriptive chapters giving a graphic and detailed account of the most interesting and historic disasters of the past from ancient times to the present day.

BY TRUMBULL WHITE
Historian, Traveler and Geographer.

Profusely Illustrated with Photographic Scenes of the Great Disasters and Views of the Devastated Cities and Their People.

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PREFACE

IN PRESENTING this history of the San Francisco Earthquake Horror and Conflagration to the public, the publishers can assure the reader that it is the most complete and authentic history of the great disaster published.

The publishers set out with the determination to produce a work that would leave no room for any other history on this subject, a task for which they had the best facilities and the most perfect equipment.

The question of cost was not taken into consideration. The publishers wanted the best writers, the best illustrations, the best paper, printing and binding and proceeded immediately to get them. The services of the two best historical writers in the United States were secured within an hour after the first news of the catastrophe was received. The names and historical works of Richard Linthicum and Trumbull White are known in every household in the United States where current history is read. They are the authors of many standard works, including histories of recent wars and books of permanent reference, and rank among the world's greatest descriptive writers.

A large staff of photographers have supplied illustrations for this great historical work depicting every phase of the catastrophe from the first shock of earthquake to the final work of relief. These illustrations have special interest and value because they are made from actual photographs taken by trained and skilled photographers. This history of the most recent of the world's great disasters is beyond all comparison the most sumptuously and completely illustrated of any publication on this subject. So

numerous are the illustrations and so accurately do they portray every detail of the quake and fire that they constitute in themselves a complete, graphic and comprehensive pictorial history of the great catastrophe.

The story as told by the authors, however, is one of absorbing interest that thrills the reader with emotion and depicts the scenes of terror, destruction, misery and suffering as vividly as if the reader were an eyewitness to all the details of the stupendous disaster.

The history of the Earthquake and Fire Horror is told consecutively and systematically from beginning to end.

"The Doomed City" is a pen picture of San Francisco while its destruction was impending.

The four days of the conflagration are described each in separate chapters in such a way that the reader can follow the progress of the fire from the time of the first alarm until it was conquered by the dynamite squad of heroes.

A great amount of space has been devoted to "Thrilling Personal Experiences" and "Scenes of Death and Terror," so that the reader has a thousand and one phases of the horror as witnessed by those who passed through the awful experience of the earthquake shock and the ordeal of the conflagration.

For purposes of comparison a chapter has been devoted to a magnificent description of San Francisco before the fire, "The City of a Hundred Hills," the Mecca of sight-seers and pleasure loving travelers.

The descriptions of the Refuge Camps established in Golden Gate Park, the Presidio and other open spaces depict the sorrow and the suffering of the stricken people in words that appeal to the heart.

The magnificent manner in which the whole nation responded with aid and the conduct of the relief work are told in a way that brings a thrill of pride to every American heart.

"Fighting the Fire with Dynamite" is a thrilling chapter of

personal bravery and heroism, and the work of the "Boys in Blue" who patrolled the city and guarded life and property is adequately narrated.

Chinatown in San Francisco was one of the sights of the world and was visited by practically every tourist that passed through the Golden Gate. That odd corner of Cathay which was converted into a a roaring furnace and completely consumed is described with breathless interest.

The "Ruin and Havoc in Other Coast Cities" describes the destruction of the great Leland Stanford, Jr., University, the scenes of horror and death at the State Asylum which collapsed, and in other ruined cities of the Pacific coast.

"The Earthquake as Viewed by Scientists" is a valuable addition to the seismology of the world—a science that is too little known, but which possesses tremendous interest for everyone.

The threatened destruction of Naples by the volcano of Vesuvius preceding the San Francisco disaster is fully described. The chapters on Vesuvius are especially valuable and interesting, by reason of the scientific belief that the two disasters are intimately related.

Altogether this volume is the best and most complete history of all the great disasters of the world and one that should be in the hands of every intelligent citizen, both as a historical and reference volume. THE PUBLISHERS.

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THE BREAD LINE. This photograph of one of the refugee camps, in which possibly 25,000 homeless people found shelter, shows the hungry, both millionaires and paupers, standing in line to obtain the daily rations served by the relief committees. For days this was the only means of getting food

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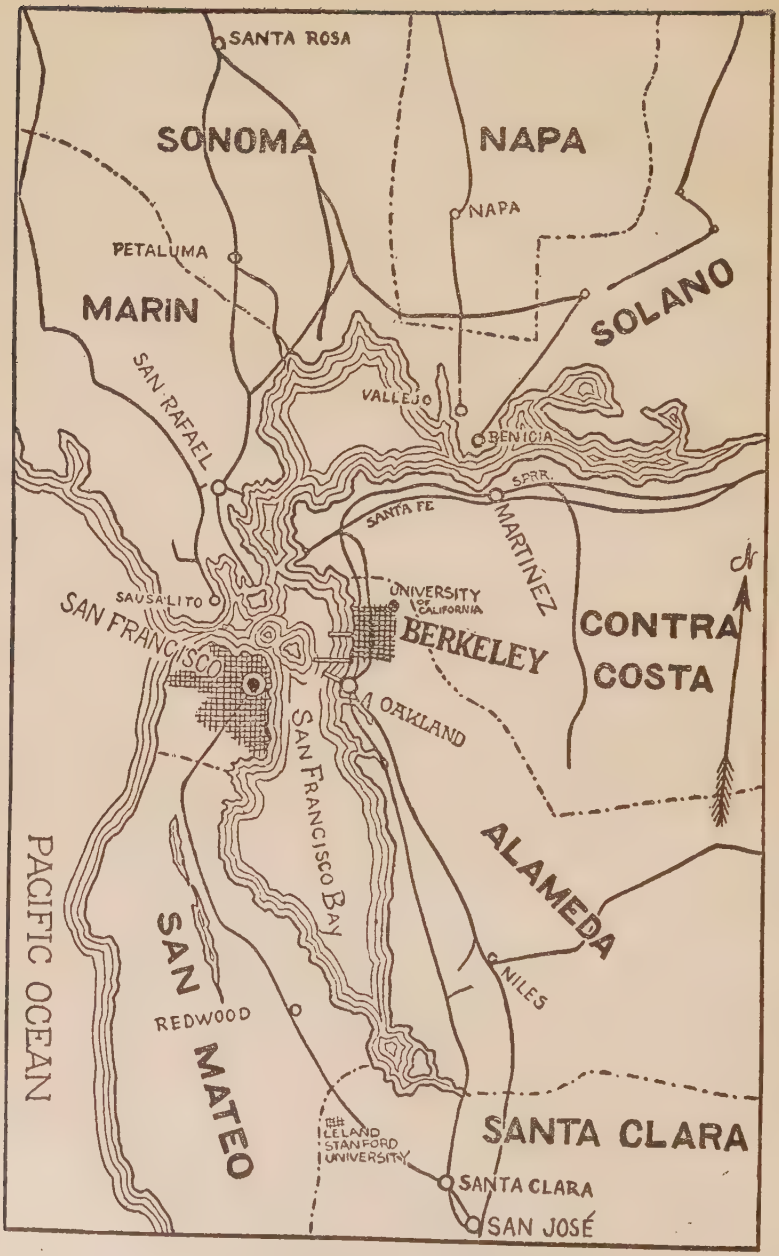


MAP OF SAN FRANCISCO AND VICINITY.

Showing towns and section of country that suffered the most from effects of earthquake.

INTRODUCTION

By the Rt. Rev. Samuel Fallows, D. D., LL. D.

A BRIGHT, intelligent unbeliever in the Providential government of the world has just said to me in discussing this greatest of calamities which has occurred in our nation's history, "Where is your benevolent God?" I answered "He still lives and guides the affairs of men." Another said, "The preachers would do well not to meddle with the subject." But the reply was made, "It is precisely the subject with which they, more than others, should concern themselves."

It is for them, when the hearts of men are failing to confidently proclaim that God has not abdicated his throne, and that man is not the sport of malign and lawless forces.

All events are ordered for the best; and the evils which we suffer are parts of a great movement conducted by Almighty power, under the direction of Infinite Wisdom and Goodness. God's creation is a perfect work. The world in which we live is the best possible world on the whole; not the best possible to the individual at any given moment, but the best possible on the whole, all creatures considered and all the ages of man taken into the account. This is the affirmation of a triumphant optimism.

John Stuart Mill averred that a better world could have been made and more favorable conditions for man devised. But before this hypothesis can be sustained, the skeptic from the beginning of time must have scanned the history of every individual and studied it in its minutest details. He must have explored every rill and river of influence entering into his character. He must have understood every relation of the individual to every other

person through all the ages. He must have mastered all the facts and laws of our earth. And as it sustains a vital connection with the solar system, he must have grasped all the mysteries which are involved in it.

As this system is related to the still grander one of which it is a part, he must have known the law and workings of its every star and sun. Still more, he must have gone from system to system with their millions of worlds and become familiar with every part of the vast stupendous whole. He must have learned every secret of all Nature's forces, and have penetrated into the interior recesses of the Divine Being. He must have taken the place of God Himself.

A Divine Providence.

Amid all our doubts and distresses we must hold fast to the belief that there is a God who maketh the clouds His chariot and walketh upon the wings of the wind—a God who is present in every summer breath and every wintry blast, in every budding leaf, and every opening flower, in the fall of every sparrow and the wheeling of every world. His Providence is in every swinging of the tides, in every circulation of the air, in all attractions and repulsions, in all cohesions and gravitations. These, and the varied phenomena of nature are the direct expressions of the Divine Energy, the modes of operation of the Divine Mind, the manifestations of the Divine Wisdom and the expressions of the Divine Love.

The very thunderbolt that rives the oak and by its shock sunders the soul from the body of some unfortunate one purifies the air that millions may breathe the breath of life.

The very earthquake which shakes the earth to its center and shatters cities into ruin, prevents by that very concussion the graver catastrophes which bury continents out of sight.

The very hurricane which comes sweeping down and on, pros-

trating forests, hurling mighty tidal waves on the shore and sending down many a gallant ship with all its crew, bears on its destructive wings, "the incense of the sea," to remotest parts, that there may be the blooming of flowers, the upspringing of grass, the waving of all the banners of green, and the carrying away of the vapors of death that spring from decaying mold.

Man the Conqueror.

Pascal said "man is but a reed, the feeblest thing in nature, but he is a reed that thinks." The elemental forces break loose and for the time being he cannot control them. Amid nature's convulsions he is utterly helpless and insignificant.

It is but for a moment, however, that he yields. He knows that he is the central figure in the universe of worlds. "He is not one part of the furniture of this planet, not the highest merely in the scale of its creatures but the lord of all." He is not a parasite but the paragon of the globe. He has faith in the unchangeableness of the laws he is mastering while suffering from them. He confidently declares there is nothing fitful, nothing capricious, nothing irregular in their action. The greater the calamity the more earnest his effort to ascertain its causes and learn the lessons it teaches.

Fearlessly man must meet the events of life as they come. Speculations as to future cataclysms and fearful forebodings as to the immediate end of the world must all be given to the winds. There will be at some time an end to our globe. It may be frozen out, or burned out, or scattered into impalpable dust by the terrific explosion of steam generated by an ocean of water precipitated into an ocean of fire. But cycles of millenniums will intervene before such an apocalypse takes place.

In the spirit of Campbell's "Last Man" we must live, and act;

> "Go sun, while mercy holds me up
> On nature's awful waste

To taste the last and bitter cup
Of death, that man must taste:
Go, say thou saw'st the last of Adam's race
On earth's sepulchral clod,
The darkening Universe defy,
To quench his immortality
Or shake his trust in God."

Wickedness not the Cause of Destruction.

There are among us men who seem to suppose that they have been let into the counsels of the Almighty and have the right to aver that this calamity so colossal in its proportions and awful in its character is a judgment upon our sister city for its great wickedness. I heard similar declarations when Chicago was swept by its tornado of flame. Neither Chicago nor San Francisco could claim to be pre-eminent in righteousness, but, that Divine Providence should visit the vials of His wrath in an especial manner upon them because of their iniquity, is utterly repugnant both to reason and Holy Scripture. Only by a special revelation from the Most High, accompanied with evidence corresponding to that which substantiates the claims of an Old Testament prophet can any warrant be given to any man to declare that a great catastrophe is the consequence of the moral sins of a given community.

The Book of Job gives the emphatic denial to the claim that specific human misery and suffering are the sure signs of the retribution for specific guilt or sin. The Great Teacher and Divine Savior of men reaffirmed the truth of the teachings of that ancient poem by asserting that the man born blind was not thus grievously afflicted because he himself or his parents had been guilty of some peculiar iniquity. He declared that the eighteen persons who had been killed by the falling of the Tower of Siloam (probably from an earthquake shock), were not greater sinners than those who were hearing him speak.

The Unity of Humanity.

This great disaster has given a new emphasis to our National Unity. Congress for the first time has voted to aid directly a city in distress within the bounds of our country. State Legislatures have followed its example, while municipal organizations by the score have poured out their benefactions.

From all quarters of the civilized globe expressions of sympathy have come and tenders of help made, without parallel in the annals of time.

All this has revealed the essential oneness of Humanity. It has shown that beneath all the artificial distinctions of society man is the equal of his fellow man. All the barriers of nationality, creed, color, social position, riches, poverty have been broken down in the common sufferings of the stricken people on our Western Coast. The chord of brotherhood is vibrating in all our hearts. Its divine melodies are heard above the roar and rush of business in our streets. We have been amassing wealth too often selfishly, and madly. We have been making money our god; and now we see how vain a thing it is in which to put our trust. Now we feel "it is more blessed to give than to receive." Now, kindness and tenderness melt the hardness of our natures. Now, as we stretch the helping hand and witness the joy and gratitude evoked, by our God-like deeds, we feel in every fiber of our being the thrill of the poet's rapt exclamation:

> "O, if there be an Elysium on earth
> It is this, it is this."

Recovery from Earthquakes.

Earthquakes throughout the world have not disturbed the ultimate confidence of man in the stability of this old and often seemingly wayward earth. All Greece was convulsed centuries ago from center to circumference and Constantinople for the second time was overturned with the loss of tens of thousands of lives.

Five hundred years afterwards the city was again shaken and a large number of its buildings destroyed with an appalling loss of life. Again and again was the ancient city of Antioch shattered in almost every portion but each time she arose stronger than before. Fifteen hundred years ago one mighty schock cost the lives of 250,000 of its people, but Antioch remains, although its grandeur from other causes has departed. Twice at least has Naples been partly destroyed along with its neighboring towns and more than 100,000 people have perished. But Naples is still on the map of the earth.

Lisbon, one hundred and fifty years ago lost 50,000 of its inhabitants and had a part of its territory suddenly submerged under 600 feet of water. For 5,000 miles the earthquake extended and shook Scotland itself, alarming the English people and causing fasting and prayer and special sermons in the Scotch and Anglican churches.

Two hundred years ago Tokio was almost entirely destroyed. Every building was practically in ruins and more than 200,000 were numbered among its mangled dead. Again in 1855 it nearly suffered a similar fate with a decreased though very large loss of life. But Tokio has helped Japan play its dramatic part in the recent history of the world.

Graphic descriptions have been left us by eye witnesses of the tremendous upheaval in the great Mississippi Valley in 1811, when the flow of the mighty river was stopped, and the land on its banks for vast distances from its current was sunk for a stretch of nearly 300 miles. But the Father of Waters still goes on unvexed to the sea.

Charleston was sadly shaken twenty years ago, but her streets are not deserted. Senator Tillman still speaks vigorously as the representative of her wide-awake and increasing population.

Some of us have not forgotten when we saw Chicago burning in 1871, the doubts and fears of our own hearts regarding the

future of our city. Jeremiads were oracularly and dolefully uttered by many a prophetic pessimist that Chicago would never be rebuilt, that it would be burned again if it should rise from its ashes. Well! it did rise. It was again sadly burned. It again arose. It has been rising and growing ever since. And it is now ready to send its millions of dollars and more if needed to the stricken cities on our Pacific coast.

Not in fear then, but in hope, must our homes, our churches, our schools, our manufactories, our marts of trade, our bank buildings, our office buildings and other needed structures be established.

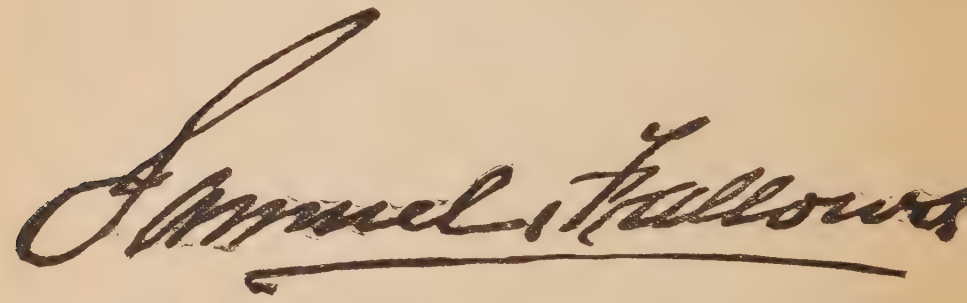
San Francisco will be Rebuilt.

The prophets of evil may croak as dismally as they may desire and predict that the earth will again shudder and quake and imperil if not destroy any city man may attempt to create on the now dismantled and disfigured site. But San Francisco will as surely be rebuilt as the sun rises in heaven. No earthquake upheaval can shake the determined will of the unconquerable American to recover from disaster. It will simply serve to make him more rock-rooted and firm in his purpose to pluck victory from defeat. No fiery blasts can burn up the asbestos of his unconsumable energy. No disaster, however seemingly overwhelming, can daunt his faith or dim his hope, or prevent his progress.

San Francisco occupies the imperial gateway of the Pacific. Her harbor, one of the best in the world, still preserves its contour and extends its protecting arms as when Francis Drake found his way into it nearly four hundred years ago. The finger of Providence still points to it amid wreck and ruin and smoldering ashes as the place where a teeming city with every mark of a splendid civilization shall be the pride of our Western shores. Her wailing Miserere shall be turned into a joyful Te Deum.

Not for a moment after the temporary paralysis is past will

the work of reconstruction be delayed. We know not when another shock may come or whether it will come again at all. No matter. The city shall rise again. And with it, shall the other cities that have suffered from the earth's commotion rise again into newness of life. California will not cease to be the land of fruits and flowers, of beauty and bounty, of sunshine and splendor from this temporary disturbance. It will continue to maintain its just reputation for all that is admirable in the American character, of pluck and perseverance, of vigor and versatility, and above all of the royal hospitality of its homes and of the welcome it always extends to every new and inspiring thought.



RUINS OF MEMORIAL CHAPEL, LELAND STANFORD UNIVERSITY. This beautiful memorial costing $1,000,000, was almost totally destroyed by the earthquake. Many other buildings of the university were badly damaged, but the engineer shut off the electric currents before any fire started. He lost his life while doing so.

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AUTOMOBILES CARRYING DYNAMITE. The military authorities requisitioned motor cars and in fact all vehicles that were available, in order to transport dynamite quickly to the points where it was most needed. Building on the left is ruins of Masonic Temple.

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CHAPTER I.

THE DOOMED CITY.

Earthquake Begins the Wreck of San Francisco and a Conflagration without Parallel Completes the Awful Work of Destruction—Tremendous Loss of Life in Quake and Fire—Property Loss $200,000,000.

AFTER four days and three nights that have no parallel outside of Dante's Inferno, the city of San Francisco, the American metropolis by the Golden Gate, was a mass of glowing embers fast resolving into heaps and winrows of grey ashes emblematic of devastation and death.

Where on the morning of April 18, 1906, stood a city of magnificent splendor, wealthier and more prosperous than Tyre and Sidon of antiquity, enriched by the mines of Ophir, there lay but a scene of desolation. The proud and beautiful city had been shorn of its manifold glories, its palaces and vast commercial emporiums levelled to the earth and its wide area of homes, where dwelt a happy and a prosperous people, lay prostrate in thin ashes. Here and there in the charred ruins and the streets lately blackened by waves of flame, lay crushed or charred corpses, unheeded by the survivors, some of whom were fighting desperately for their lives and property, while others were panic stricken and paralyzed by fear. Thousands of lives had been sacrificed and millions upon millions of dollars in property utterly destroyed.

The beginning of the unparalleled catastrophe was on the morning of April 18, 1906. In the grey dawn, when but few had arisen for the day, a shock of earthquake rocked the foundations of the city and precipitated scenes of panic and terror throughout the business and residence districts.

It was 5:15 o'clock in the morning when the terrific earthquake shook San Francisco and the surrounding country. One shock apparently lasted two minutes and there was an almost immediate collapse of flimsy structures all over the former city. The water supply was cut off and when fires broke out in various sections there was nothing to do but to let the buildings burn. Telegraphic and telephone communication was shut off. Electric light and gas plants were rendered useless and the city was left without water, light or power. Street car tracks were twisted out of shape and even the ferry-boats ceased to run.

The dreadful earthquake shock came without warning, its motion apparently being from east to west. At first the upheaval of the earth was gradual, but in a few seconds it increased in intensity. Chimneys began to fall and buildings to crack, tottering on their foundations.

People became panic stricken and rushed into the streets, most of them in their night attire. They were met by showers of falling buildings, bricks, cornices and walls. Many were instantly crushed to death, while others were dreadfully mangled. Those who remained indoors generally escaped with their lives, though scores were hit by detached plaster, pictures and articles thrown to the floor by the shock.

Scarcely had the earth ceased to shake when fires broke out simultaneously in many places. The fire department promptly responded to the first calls for aid, but it was found that the water mains had been rendered useless by the underground movement. Fanned by a light breeze, the flames quickly spread and soon many blocks were seen to be doomed.

Then dynamite was resorted to and the sound of frequent explosions added to the terror of the people. All efforts to stay the progress of the fire, however, proved futile. The south side of Market street from Ninth street to the bay was soon ablaze, the fire covering a belt two blocks wide. On this, the main thoroughfare of the city, are located many of the finest edifices in the city,

including the Grant, Parrott, Flood, Call, Examiner and Monadnock buildings, the Palace and Grand hotels and numerous wholesale houses.

At the same time the commercial establishments and banks north of Market street were burning. The burning district in this section extended from Sansome street to the water front and from Market street to Broadway. Fires also broke out in the mission and the entire city seemed to be in flames.

The fire swept down the streets so rapidly that it was practically impossible to save anything in its way. It reached the Grand Opera House on Mission street and in a moment had burned through the roof. The Metropolitan opera company from New York had just opened its season there and all the expensive scenery and costumes were soon reduced to ashes. From the opera house the fire leaped from building to building, leveling them almost to the ground in quick succession.

The Call editorial and mechanical departments were totally destroyed in a few minutes and the flames leaped across Stevenson street toward the fine fifteen-story stone and iron Claus Spreckels building, which with its lofty dome is the most notable edifice in San Francisco. Two small wooden buildings furnished fuel to ignite the splendid pile.

Thousands of people watched the hungry tongues of flame licking the stone walls. At first no impression was made, but suddenly there was a cracking of glass and an entrance was affected. The interior furnishings of the fourth floor were the first to go. Then as though by magic, smoke issued from the top of the dome.

This was followed by a most spectacular illumination. The round windows of the dome shone like so many full moons; they burst and gave vent to long, waving streamers of flame. The crowd watched the spectacle with bated breath. One woman wrung her hands and burst into a torrent of tears.

"It is so terrible!" she sobbed. The tall and slender structure

which had withstood the forces of the earth appeared doomed to fall a prey to fire. After a while, however, the light grew less intense and the flames, finding nothing more to consume, gradually went, leaving the building standing but completely burned out.

The Palace Hotel, the rear of which was constantly threatened, was the scene of much excitement, the guests leaving in haste, many only with the clothing they wore. Finding that the hotel, being surrounded on all sides by streets, was likely to remain immune, many returned and made arrangements for the removal of their belongings, though little could be taken away owing to the utter absence of transportation facilities. The fire broke out anew and the building was soon a mass of ruins.

The Parrott building, in which were located the chambers of the state supreme court, the lower floors being devoted to an immense department store, was ruined, though its massive walls were not all destroyed.

A little farther down Market street the Academy of Sciences and the Jennie Flood building and the History building kindled and burned like tinder. Sparks carried across the wide street ignited the Phelan building and the army headquarters of the department of California, General Funston commanding, were burned.

Still nearing the bay, the waters of which did the firemen good service, along the docks, the fire took the Rialto building, a handsome skyscraper, and converted scores of solid business blocks into smoldering piles of brick.

Banks and commercial houses, supposed to be fireproof though not of modern build, burned quickly and the roar of the flames could be heard even on the hills, which were out of the danger zone. Here many thousands of people congregated and witnessed the awful scene. Great sheets of flame rose high in the heavens or rushed down some narrow street, joining midway between the

sidewalks and making a horizontal chimney of the former passage ways.

The dense smoke that arose from the entire business spread out like an immense funnel and could have been seen for miles out at sea. Occasionally, as some drug house or place stored with chemicals was reached, most fantastic effects were produced by the colored flames and smoke which rolled out against the darker background.

When the first shock occurred at 5:15 a. m. most of the population were in bed and many lodging houses collapsed with every occupant. There was no warning of the awful catastrophe. First came a slight shock, followed almost immediately by a second and then the great shock that sent buildings swaying and tumbling. Fire broke out immediately. Every able-bodied man who could be pressed into service was put to work rescuing the victims.

Panic seized most of the people and they rushed frantically about. Toward the ferry building there was a rush of those fleeing to cross the bay. Few carried any effects and some were hardly dressed. The streets were filled immediately with panic-stricken people and the frequently occurring shocks sent them into unreasoning panic. Fires lighted up the sky in every direction in the breaking dawn. In the business district devastation met the eye on every hand.

The area bounded by Washington, Mission and Montgomery streets and extending to the bay front was quickly devastated. That represented the heart of the handsome business section.

The greatest destruction on the first day occurred in that part of the city which was reclaimed from San Francisco Bay. Much of the devastated district was at one time low marshy ground entirely covered by water at high tide. As the city grew it became necessary to fill in many acres of this low ground in order to reach deep water. The Merchants' Exchange building, a four-

teen-story steel structure, was situated on the edge of this reclaimed ground. It had just been completed and the executive offices of the Southern Pacific Company occupied the greater part of the building.

The damage by the earthquake to the residence portion of the city, the finest part of which was on Nob Hill and Pacific Heights, was slight but the fire completely destroyed that section on the following day.

To the westward, on Pacific Heights, were many fine, new residences, but little injury was done to any of them by the quake.

The Palace Hotel, a seven-story building about 300 feet square, was built thirty years ago by the late Senator Sharon, whose estate was in the courts for many years. At the time it was erected the Palace was considered the best equipped hotel in the west.

The offices of the three morning papers, the Chronicle, the Call and the Examiner, were located within 100 feet of each other. The Chronicle, situated at the corner of Market and Kearney streets, was a ten-story steel frame building and was one of the finest buildings of its character put up in San Francisco.

The Spreckels building, in which were located the business office of the Call, was sixteen stories high and very narrow. The editorial rooms, composing room and pressroom were in a small three-story building immediately in the rear of the Spreckels building.

Just across Third street was the home of the Examiner, seven stories high, with a frontage of 100 feet on Market street.

The postoffice was a fine, grey stone structure and had been completed less than two years. It covered half a block on Mission street between Sixth and Seventh streets. The ground on which the building stood was of a swampy character and some difficulty was experienced in obtaining a solid foundation.

The City Hall, which was badly wrecked by the quake and afterwards swept by the fire, was a mile and a half from the water front. It was an imposing structure with a dome 150 feet high. The building covered about three acres and cost more than $7,000,000.

The Grand Opera House, where the Metropolitan Opera Company opened a two weeks' engagement the previous Monday night, was one of the oldest theaters in San Francisco. It was located on Mission street between Third and Fourth streets and for a number of years was the leading playhouse of the city.

In 1885 when business began to move off of Mission street and to seek modern structures this playhouse was closed for some time and later devoted to vaudeville. Within the past four years, however, numerous fine buildings had been erected on Mission street and the Grand Opera house had been used by many of the leading independent theatrical companies.

All efforts to prevent the fire from reaching the Palace and Grand hotels were unsuccessful and both were completely destroyed together with all their contents.

All of San Francisco's best playhouses, including the Majestic, Columbia, Orpheum and Grand Opera house were soon a mass of ruins. The earthquake demolished them for all practical purposes and the fire completed the work of demolition. The handsome Rialto and Casserly buildings were burned to the ground, as was everything in that district.

The scene at the Mechanics' Pavilion during the early hours of the morning and up until noon, when all the injured and dead were removed because of the threatened destruction of the building by fire, was one of indescribable sadness. Sisters, brothers, wives and sweethearts searched eagerly for some missing dear one.

Thousands of persons hurriedly went through the building inspecting the cots on which the sufferers lay in the hope that they would locate some loved one that was missing.

The dead were placed in one portion of the building and the remainder was devoted to hospital purposes. The fire forced the nurses and physicians to desert the building; the eager crowds followed them to the Presidio and the Children's hospital, where they renewed their search for missing relatives.

The experience of the first day of the fire was a great testimonial to the modern steel building. A score of those structures were in course of erection and not one of them suffered. The completed modern buildings were also immune from harm by earthquake. The buildings that collapsed were all flimsy, wooden and old-fashioned brick structures.

On the evening of Wednesday, April 18, the first day of the fire, an area of thickly covered ground of eight square miles had been burned over and it was apparent that the entire city was doomed to destruction.

Nearly every famous landmark that had made San Francisco famous over the world had been laid in ruins or burned to the ground in the dire catastrophe. Never was the fate of a city more disastrous.

For three miles along the water front buildings had been swept clean and the blackened beams and great skeletons of factories and offices stood silhouetted against a background of flame that was slowly spreading over the entire city.

The whole commercial and office section of the city on the north side of Market street from the ferry building to Tenth street had been consumed in the hell of flame, while hardly a building was standing in the district south of Market street. At 2 o'clock in the afternoon, despite the heroic work of the firemen and the troops of dynamiters, who razed building after building and blew up property valued at millions, the flames spread across Market street to the north side and swept up Montgomery street, practically to Washington street. Along Montgomery street were some of the richest banks and commercial houses in San Francisco.

BIRDS-EYE VIEW OF SAN FRANCISCO.

A general view of city looking west toward the Pacific Ocean, also showing locations such as Nob Hill, business district, Market Street, Golden Gate and the famous Cliff House.

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CRACKS CAUSED BY EARTHQUAKE.

Front new Postoffice.

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EMPORIUM BUILDING.

Largest department store west of Chicago

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U. S. GUARDS IN CHARGE OF DEAD.

A scene in Jefferson Square where the U. S. Guards are caring for the dead. Note the caskets, dead person layed out on mattress also guard tents, embalming fluids in demijohns, etc. Name or description of the dead being recorded.

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STREET TORN UP BY EARTHQUAKE.

A photograph of street in front of new Postoffice. Note how the car tracks are thrown up and twisted.

The famous Mills building and the new Merchants Exchange were still standing, but the Mutual Life Insurance building and scores of bank and office buildings were on fire, while blocks of other houses were in the path of the flames and nothing seemed to be at hand to stay their progress.

Nearly every big factory building had been wiped out of existence and a complete enumeration of them would look like a copy of the city directory.

Many of the finest buildings in the city had been leveled to dust by the terrific charges of dynamite in hopeless effort to stay the horror of fire. In this work many heroic soldiers, policemen and firemen were maimed or killed outright.

At 10 o'clock at night the fire was unabated and thousands of people were fleeing to the hills and clamoring for places on the ferry boats at the ferry landing.

From the Cliff House came word that the great pleasure resort and show place of the city, which stood upon a foundation of solid rock, had been swept into the sea. This report proved to be unfounded, but it was not until three days later that any one got close enough to the Cliff House to discover that it was still safe.

One of the big losses of the day was the destruction of St. Ignatius' church and college at Van Ness avenue and Hayes street. This was the greatest Jesuitical institution in the west and built at a cost of $2,000,000.

By 7 o'clock at night the fire had swept from the south side of the town across Market street into the district called the Western addition and was burning houses at Golden Gate avenue and Octavia. This result was reached after almost the entire southern district from Ninth street to the eastern water front had been converted into a blackened waste. In this section were hundreds of factories, wholesale houses and many business firms, in addition to thousands of homes.

CHAPTER II.

SAN FRANCISCO A ROARING FURNACE.

Flames Spread in a Hundred Directions and the Fire Becomes the Greatest Conflagration of Modern Times—Entire Business Section and Fairest Part of Residence District Wiped Off the Map —Palaces of Millionaires Vanish in Flames or are Blown Up by Dynamite—The Worst Day of the Catastrophe.

MARIUS sitting among the ruins of Carthage saw not such a sight as presented itself to the afflicted people of San Francisco in the dim haze of the smoke pall at the end of the second day. Ruins stark naked, yawning at fearful angles and pinnacled into a thousand fearsome shapes, marked the site of what was three-fourths of the total area of the city.

Only the outer fringe of the city was left, and the flames which swept unimpeded in a hundred directions were swiftly obliterating what remained.

Nothing worthy of the name of building in the business district and not more than half of the residence district had escaped. Of its population of 400,000 nearly 300,000 were homeless.

Gutted throughout its entire magnificent financial quarters by the swift work of thirty hours and with a black ruin covering more than seven square miles out into her very heart, the city waited in a stupor the inevitable struggle with privation and hardship.

All the hospitals except the free city hospital had been destroyed, and the authorities were dragging the injured, sick and dying from place to place for safety.

All day the fire, sweeping in a dozen directions, irresistibly completed the desolation of the city. Nob Hill district, in which

were situated the home of Mrs. Stanford, the priceless Hopkins Art Institute, the Fairmount hotel, a marble palace that cost millions of dollars and homes of a hundred millionaires, was destroyed.

It was not without a struggle that Mayor Schmitz and his aids let this, the fairest section of the city, suffer obliteration. Before noon when the flames were marching swiftly on Nob Hill, but were still far off, dynamite was dragged up the steep debris laden streets. For a distance of a mile every residence on the east side of Van Ness avenue was swept away in a vain hope to stay the progress of the fire.

After sucking dry even the sewers the fire engines were either abandoned or moved to the outlying districts.

There was no help. Water was gone, powder was gone, hope even was a fiction. The fair city by the Golden Gate was doomed to be blotted from the sight of man.

The stricken people who wandered through the streets in pathetic helplessness and sat upon their scattered belongings in cooling ruins reached the stage of dumb, uncaring despair, the city dissolving before their eyes had no significance longer.

There was no business quarter; it was gone. There was no longer a hotel district, a theater route, a place where Night beckoned to Pleasure. Everything was gone.

But a portion of the residence domain of the city remained, and the jaws of the disaster were closing down on that with relentless determination.

All of the city south of Market street, even down to Islais creek and out as far as Valencia street, was a smouldering ruin. Into the western addition and the Pacific avenue heights three broad fingers of fire were feeling their way with a speed that foretold the destruction of all the palace sites of the city before the night would be over.

There was no longer a downtown district. A blot of black spread from East street to Octavia, bounded on the south and

north by Broadway and Washington streets and Islais creek respectively. Not a bank stood. There were no longer any exchanges, insurance offices, brokerages, real estate offices, all that once represented the financial heart of the city and its industrial strength.

Up Market street from the Ferry building to Valfira street nothing but the black fingers of jagged ruins pointed to the smoke blanket that pressed low overhead. What was once California, Sansome, and Montgomery streets was a labyrinth of grim blackened walls.

Chinatown was no more. Union square was a barren waste.

The Call building stood proudly erect, lifting its whited head above the ruin like some leprous thing and with all its windows, dead, staring eyes that looked upon nothing but a wilderness. The proud Flood building was a hollow shell.

The St. Francis Hotel, one time a place of luxury, was naught but a box of stone and steel.

Yet the flames leaped on exultantly. They leapt chasms like a waterfall taking a precipice. Now they are here, now there, always pressing on into the west and through to the end of the city.

It was supposed that the fire had eaten itself out in the wholesale district below Sansome street, and that the main body of the flames was confined to the district south of Market street, where the oil works, the furniture factories, and the vast lumber yards had given fodder into the mouth of the fire fiend.

Yet, suddenly, as if by perverse devilishness, a fierce wind from the west swept over the crest of Nob Hill and was answered by leaping tongues of flames from out of the heart of the ruins.

By 8:30 o'clock Montgomery street had been spanned and the great Merchants' Exchange building on California street flamed out like the beacon torch of a falling star. From the dark fringe of humanity, watching on the crest of the California street hill, there sprang the noise of a sudden catching of the breath—not a

sigh, not a groan—just a sharp gasp, betraying a stress of despair near to the insanity point.

Nine o'clock and the great Crocker building shot sparks and added tongues of fire to the high heavens. Immediately the fire jumped to Kearny street, licking at the fat provender that shaped itself for consuming.

Then began the mournful procession of Japanese and poor whites occupying the rookeries about Dupont street and along Pine. Tugging at heavy ropes, they rasped trunks up the steep pavements of California and Pine streets to places of temporary safety.

It was a motley crew. Women laden with bundles and dragging reluctant children by the hands panted up the steep slope with terror stamped on their faces.

Men with household furniture heaped camelwise on their shoulders trudged stoically over the rough cobbles, with the flame of the fire bronzing their faces into the outlines of a gargoyle. One patriotic son of Nippon labored painfully up Dupont street with the crayon portrait of the emperor of Japan on his back.

While this zone of fire was swiftly gnawing its way through Kearny street and up the hill, another and even more terrible segment of the conflagration was being stubbornly fought at the corner of Golden Gate avenue and Polk street. There exhausted firemen directed the feeble streams from two hoses upon a solid block of streaming flame.

The engines pumped the supply from the sewers. Notwithstanding this desperate stand, the flames progressed until they had reached Octavia street.

Like a sickle set to a field of grain the fiery crescent spread around the southerly end of the west addition up to Oak and Fell streets, along Octavia. There one puny engine puffed a single stream of water upon the burning mass, but is efforts were like the stabbing of a pigmy at a giant.

All the district bounded by Octavia, Golden Gate avenue, and Market street was a blackened ruin. One picked his way through the fallen walls on Van Ness avenue as he would cross an Arizona mesa. It was an absolute ruin, gaunt and flame lighted.

From the midst rose the great square wall of St. Ignatius college, standing like another ruined Acropolis in dead Athens.

Behind the gaunt specter of what had once been the city hall a blizzard of flame swept back into the gore between Turk and Market streets. Peeled of its heavy stone facing like a young leek that is stripped of its wrappings, the dome of the city hall rose spectral against the nebulous background of sparks.

From its summit looked down the goddess of justice, who had kept her pedestal even while the ones of masonry below her feet had been toppled to the earth in huge blocks the size of a freight car.

Through the gaunt iron ribs and the dome the red glare suffusing the whole northern sky glinted like the color of blood in a hand held to the sun.

At midnight the Hibernian bank was doomed, for from the frame buildings west of it there was being swept a veritable maelstrom of sheet flame that leaped toward it in giant strides. Not a fireman was in sight.

Across the street amid the smoke stood the new postoffice, one of the few buildings saved. Turk street was the northern boundary of this V shaped zone of the flames, but at 2 o'clock this street also was crossed and the triumphant march onward continued.

At midnight another fire, which had started in front of Fisher's Music Hall, on O'Farrell street, had gouged its terrible way through to Market street, carrying away what the morning's blaze across the street had left miraculously undestroyed.

Into Eddy and Turk streets the flames plunged, and soon the magnificent Flood building was doomed.

The firemen made an ineffectual attempt to check the ravages

of the advancing phalanx of flames, but their efforts were absolutely without avail. First from across the street shot tongues of flames which cracked the glass in one of the Flood building's upper story windows. Then a shower of sparks was sent driving at a lace curtain which fluttered out in the draft. The flimsy whipping rag caught, a tongue of flame crept up its length and into the window casement.

"My God, let me get out of this," said a man below who had watched the massive shape of the huge pile arise defiant before the flames. "I can't stand to see that go, too."

Shortly after midnight the streets about Union Square were barred by the red stripes of the fire. First Cordes Furniture Company's store went, then Brennor's. Next a tongue of flames crept stealthily into the rear of the City of Paris store, on the corner of Geary and Stockton streets.

Eager spectators watched for the first red streamers to appear from the windows of the great dry goods stores. Smoke eddied from under window sills and through cracks made by the earthquake in the cornices. Then the cloud grew denser. A puff of hot wind came from the west, and as if from the signal there streamed flamboyantly from every window in the top floor of the structure billowing banners, as a poppy colored silk that jumped skyward in curling, snapping breadths, a fearful heraldry of the pomp of destruction.

From the copper minarets on the Hebrew synagogue behind Union square tiny green, copperly flames next began to shoot forth. They grew quickly larger, and as the heat increased in intensity there shone from the two great bulbs of metal sheathing an iridescence that blinded like a sight into a blast furnace.

With a roar the minarets exploded almost simultaneously, and the sparks shot up to mingle with the dulled stars overhead. The Union League and Pacific Union clubs next shone red with the fire that was glutting them.

On three sides ringed with sheets of flame rose the Dewey

memorial in the midst of Union square. Victory tiptoeing on the apex of the column glowed red with the flames. It was as if the goddess of battle had suddenly become apostate and a fiend linked in sympathy with the devils of the blaze.

On the first day of the catastrophe the St. Francis escaped. On the second it fell. In the space of two hours the flames had blotted it out, and by night only the charred skeleton remained.

As a prelude to the destruction of the St. Francis the fire swept the homes of the Bohemian, Pacific, Union, and Family clubs, the best in San Francisco.

With them were obliterated the huge retail stores along Post street; St. Luke's Church, the biggest Episcopal church on the Pacific coast, and the priceless Hopkins Art Institute.

From Union square to Chinatown it is only a pistol shot. By noon all Chinatown was a blazing furnace, the rickety wooden hives, where the largest Chinese colony in this country lived, was perfect fuel for the fire.

Then Nob Hill, the charmed circle of the city, the residential district of its millionaires and of those whose names have made it famous, went with the rest of the city into oblivion. The Fairmount Hotel, marble palace built by Mrs. Oelrichs, crowned this district.

Grouped around it were the residences of Mrs. Stanford, and a score of millionaires' homes on Van Ness avenue. One by one they were buried in the onrushing flames, and when the fire was passed they were gone.

Here the most desperate effort of the fight to save the city was made. Nothing was spared. There was no discrimination, no sentiment. Rich men aided willingly in the destruction of their own homes that some of the city might be saved.

But the sacrifice and the labor went for nothing. No human power could stay the flames. As darkness was falling the fire was eating its way through the heart of this residential district.

INSIDE THE MILITARY LINES. Immediately after the disaster, the authorities declared martial law, and no one was allowed inside the burned district without a pass and a badge such as is worn by the men in above picture.

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NEW POSTOFFICE BUILDING.

This costly and handsome structure was not destroyed by the fire.

The mayor was forced to announce that the last hope had been dashed.

All the district bounded by Union, Van Ness, Golden Gate, to Octavia, Hayes, and Fillmore to Market was doomed. The fire fighters, troops, citizens, and city officials left the scene, powerless to do more.

On the morning of the second day when the fire reached the municipal building on Portsmouth square, the nurses, helped by soldiers, got out fifty bodies in the temporary morgue and a number of patients in the receiving hospital. Just after they reached the street a building was blown up and the flying bricks and splinters hurt a number of the soldiers, who had to be taken to the out of doors Presidio Hospital with the patients.

Mechanics' pavilion, which, after housing prize fights, conventions, and great balls, found its last use as an emergency hospital. When it was seen that it could not last every vehicle in sight was impressed by the troops, and the wounded, some of them frightfully mangled, were taken to the Presidio, where they were out of danger and found comfort in tents.

The physicians worked without sleep and almost without food. There was food, however, for the injured; the soldiers saw to that. Even the soldiers flagged, and kept guard in relays. while the relieved men slept on the ground where they dropped.

The troops shut down with iron hands on the city, for where one man was homeless the first night five were homeless the second night. With the fire running all along the water front, few managed to make their way over to Oakland. The people for the most part were prisoners on the peninsula.

The soldiers enforced the rule against moving about except to escape the flames, and absolutely no one could enter the city who once had left.

The seat of city government and of military authority shifted with every shift of the flames. Mayor Schmitz and General Funston stuck close together and kept in touch with the fire-

men and police, the volunteer aids, and the committee of safety through couriers.

There were loud reverberations along the fire line at night. Supplies of gun cotton and cordite from the Presidio were commandeered and the troops and the few remaining firemen made another futile effort to check the fiery advance.

Along the wharves the fire tugs saved most of the docks. But the Pacific mail dock had been reached and was out of control; and finally China basin, which was filled in for a freight yard at the expense of millions of dollars, had sunk into the bay and the water was over the tracks. This was one of the greatest single losses in the whole disaster.

Without sleep and without food, crowds watched all night Wednesday and all day Thursday from the hills, looking off toward that veil of fire and smoke that hid the city which had become a hell.

Back of that sheet of fire, and retreating backward every hour, were most of the people of the city, forced toward the Pacific by the advance of the flames. The open space of the Presidio and Golden Gate park was their only haven and so the night of the second day found them.

CHAPTER III.

THIRD DAY ADDS TO HORROR.

Fire Spreads North and South Attended by Many Spectacular Features—Heroic Work of Soldiers Under General Funston—Explosions of Gas Add to General Terror.

THE third day of the fire was attended by many spectacular features, many scenes of disaster and many acts of daring heroism.

When night came the fire was raging over fifty acres of the water front lying between Bay street and the end of Meiggs and Fisherman's wharf. To the eastward it extended down to the sea wall, but had not reached the piers, which lay a quarter of a mile toward the east.

The cannery and warehouses of the Central California Canneries Company, together with 20,000 cases of canned fruit, was totally destroyed, as also was the Simpson and other lumber companies' yards.

The flames reached the tanks of the San Francisco Gas Company, which had previously been pumped out, and had burned the ends of the grain sheds, five in number, which extended further out toward the point.

Flame and smoke hid from view the vessels that lay off shore vainly attempting to check the fire. No water was available except from the waterside and it was not until almost dark that the department was able to turn its attention to this point.

At dusk the fire had been checked at Van Ness avenue and Filbert street. The buildings on a high slope between Van Ness and Polk, Union and Filbert streets were blazing fiercely, fanned by a high wind, but the blocks were so sparsely settled

that the fire had but a slender chance of crossing Van Ness at that point.

Mayor Schmitz, who directed operations at that point, conferred with the military authorities and decided that it was not necessary to dynamite the buildings on the west side of Van Ness. As much of the fire department as could be collected was assembled to make a stand at that point.

To add to the horrors of the general situation and the general alarm of many people who ascribed the cause of the subterranean trouble to another convulsion of nature, explosions of sewer gas have ribboned and ribbed many streets. A Vesuvius in miniature was created by such an upheaval at Bryant and Eighth streets. Cobblestones were hurled twenty feet upward and dirt vomited out of the ground. This situation added to the calamity, as it was feared the sewer gas would breed disease.

Thousands were roaming the streets famishing for food and water and while supplies were coming in by the train loads the system of distribution was not in complete working order.

Many thousands had not tasted food or water for two and three days. They were on the verge of starvation.

The flames were checked north of Telegraph hill, the western boundary being along Franklin street and California street southeast to Market street. The firemen checked the advance of flames by dynamiting two large residences and then backfiring. Many times before had the firemen made such an effort, but always previously had they met defeat.

But success at that hour meant little for San Francisco.

The flames still burned fitfully about the city, but the spread of fire had been checked.

A three-story lodging house at Fifth and Minna streets collapsed and over seventy-five dead bodies were taken out. There were at least fifty other dead bodies exposed. This building

was one of the first to take fire on Fifth street. At least 100 people were lost in the Cosmopolitan on Fourth street.

The only building standing between Mission, Howard, East and Stewart streets was the San Pablo hotel. The shot tower at First and Howard streets was gone. This landmark was built forty years ago. The Risdon Iron works were partially destroyed. The Great Western Smelting and Refining works escaped damages, also the Mutual Electric Light works, with slight damage to the American Rubber Company, Vietagas Engine Company, Folger Brothers' coffee and spice house was also uninjured and the firm gave away large quantities of bread and milk.

Over 150 people were lost in the Brunswick hotel, Seventh and Mission streets.

The soldiers who rendered such heroic aid took the cue from General Funston. He had not slept. He was the real ruler of San Francisco. All the military tents available were set up in the Presidio and the troops were turned out of the barracks to bivouac on the ground.

In the shelter tents they placed first the sick, second the more delicate of the women, and third, the nursing mothers, and in the afternoon he ordered all the dead buried at once in a temporary cemetery in the Presidio grounds. The recovered bodies were carted about the city ahead of the flames.

Many lay in the city morgue until the fire reached that; then it was Portsmouth square until it grew too hot; afterwards they were taken to the Presidio. There was another stream of bodies which had lain in Mechanics' pavilion at first, and had then been laid out in Columbia square, in the heart of a district devastated first by the earthquake and then by fire.

The condition of the bodies was becomnig a great danger. Yet the troops had no men to spare to dig graves, and the young and able bodied men were mainly fighting on the fire line or utterly exhausted.

It was Funston who ordered that the old men and the weaklings should take this work in hand. They did it willingly enough, but had they refused the troops on guard would have forced them. It was ruled that every man physically capable of handling a spade or a pick should dig for an hour. When the first shallow graves were ready the men, under the direction of the troops, lowered the bodies several in a grave, and a strange burial began.

The women gathered about crying; many of them knelt while a Catholic priest read the burial service and pronounced absolution. All the afternoon this went on.

Representatives of the city authorities took the names of as many of the dead as could be identified and the descriptions of the others. Many, of course, will never be identified.

So confident were the authorities that they had the situation in control at the end of the third day that Mayor Schmitz issued the following proclamation:

"To the Citizens of San Francisco: The fire is now under control and all danger is passed. The only fear is that other fires may start should the people build fires in their stoves and I therefore warn all citizens not to build fires in their homes until the chimneys have been inspected and repaired properly. All citizens are urged to discountenance the building of fires. I congratulate the citizens of San Francisco upon the fortitude they have displayed and I urge upon them the necessity of aiding the authorities in the work of relieving the destitute and suffering. For the relief of those persons who are encamped in the various sections of the city everything possible is being done. In Golden Gate park, where there are approximately 200,000 homeless persons, relief stations have been established. The Spring Valley Water Company has informed me that the Mission district will be supplied with water this afternoon, between 10,000 and 12,000 gallons daily being available. Lake Merced will be taken by the federal troups and that supply protected.

"Eugene E. Schmitz, Mayor."

Although the third day of San Francisco's desolation dawned with hope, it ended in despair.

In the early hours of the day the flames, which had raged for thirty-six hours, seemed to be checked.

Then late in the afternoon a fierce gale of wind from the northwest set in and by 7 o'clock the conflagration, with its energy restored, was sweeping over fifty acres of the water front.

The darkness and the wind, which at times amounted to a gale, added fresh terrors to the situation. The authorities considered conditions so grave that it was decided to swear in immediately 1,000 special policemen armed with rifles furnished by the federal government.

In addition to this force, companies of the national guard arrived from many interior points.

In the forenoon, when it was believed the fire had been checked, the full extent of the destitution and suffering of the people was seen for the first time in near perspective. While the whole city was burning there was no thought of food or shelter, death, injury, privation, or loss. The dead were left unburied and the living were left to find food and a place to sleep where they could.

On the morning of the third day, however, the indescribable destitution and suffering were borne in upon the authorities with crushing force. Dawn found a line of men, women, and children, numbering thousands, awaiting morsels of food at the street bakeries. The police and military were present in force, and each person was allowed only one loaf.

A big bakery was started early in the morning in the outskirts of the city, with the announcement that it would turn out 50,000 loaves of bread before night. The news spread and thousands of hungry persons crowded before its doors before the first deliveries were hot from the oven. Here again police and soldiers kept order and permitted each person to take only one loaf. The loaves were given out without cost.

These precautions were necessary, for earlier in the day bread

had sold as high as $1 a loaf and two loaves and a can of sardines brought in one instance $3.50.

Mayor Schmitz took prompt and drastic steps to stop this extortion. By his order all grocery and provision stores in the outlying districts which had escaped the flames were entered by the police and their goods confiscated.

Next to the need for food there was a cry for water, which until Friday morning the authorities could not answer.

In spite of all efforts to relieve distress there was indescribable suffering.

Women and children who had comfortable, happy homes a few days before slept that night—if sleep came at all—on hay on the wharves, on the sand lots near North beach, some of them under the little tents made of sheeting, which poorly protected them from the chilling ocean winds. The people in the parks were better provided in the matter of shelter, for they left their homes better prepared.

Thousands of members of families were separated, ignorant of one another's whereabouts and without means of ascertaining. The police on Friday opened up a bureau of registration to bring relatives together.

The work of burying the dead was begun Friday for the first time. Out at the Presidio soldiers pressed into service all men who came near and forced them to labor at burying the dead. So thick were the corpses piled up that they were becoming a menace, and early in the day the order was issued to bury them at any cost. The soldiers were needed for other work, so, at the point of rifles, the citizens were compelled to take the work of burying. Some objected at first, but the troops stood no trifling, and every man who came in reach was forced to work at least one hour. Rich men who had never done such work labored by the side of the workingmen digging trenches in the sand for the sepulcher of those who fell in the awful calamity. At the present

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CRACK IN THE EARTH.

This photograph shows a crack in the earth in Golden Gate Park, San Francisco, caused by the earthquake.

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COOKING IN THE STREET.

A familiar scene in San Francisco after the disaster.

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MILITARY CAMP.

View in Golden Gate Park. Too much praise cannot be given our soldiers.

Copyright 1906 by Tom M. Phillips.

SEEKING LOST FRIENDS.

San Francisco Call Register Bureau. Looking for names on cards.

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VAN NESS AVENUE RESIDENCE.

All that was left of a fine residence.

MISSION DOLORES.

This is the oldest building in San Francisco. It was founded October 8, 1776. Noted as a mission church.

writing many still remain unburied and the soldiers are still pressing men into service.

The Folsom street dock was turned into a temporary hospital, the harbor hospital being unable to accommodate all the injured who were brought there.

About 100 patients were stretched on the dock at one time. In the evening tugs conveyed them to Goat Island, where they were lodged in the hospital. The docks from Howard street to Folsom street had been saved, and the fire at this point was not permitted to creep farther east than Main street.

The work of clearing up the wrecked city has already begun at the water front in the business section of the town. A force of 100 men were employed under the direction of the street department clearing up the debris and putting the streets in proper condition.

It was impossible to secure a vehicle except at extortionate prices. One merchant engaged a teamster and horse and wagon, agreeing to pay $50 an hour. Charges of $20 for carrying trunks a few blocks were common. The police and military seized teams wherever they required them, their wishes being enforced at revolver point if the owner proved indisposed to comply with the demands.

Up and down the broad avenues of the parks the troops patrolled, keeping order. This was difficult at times, for the second hysterical stage had succeeded the paralysis of the first day and people were doing strange things. A man, running half naked, tearing at his clothes, and crying, "The end of all things has come!" was caught by the soldiers and placed under arrest.

Under a tree on the broad lawn of the children's playground a baby was born. By good luck there was a doctor there, and the women helped out, so that the mother appeared to be safe. They carried her later to the children's building in the park and did their best to make her comfortable.

All night wagons mounted with barrels and guarded by sol-

diers drove through the park doling out water. There was always a crush about these wagons and but one drink was allowed to a person.

Separate supplies were sent to the sick in the tents. The troops allowed no camp fires, fearing that the trees of the park might catch and drive the people out of this refuge to the open and windswept sands by the ocean.

The wind which had saved the heights came cold across the park, driving a damp fog, and for those who had no blankets it was a terrible night, for many of them were exhausted and must sleep, even in the cold. They threw themselves down in the wet grass and fell asleep.

When the morning came the people even prepared to make the camp permanent. An ingenious man hung up before his little blanket shelter a sign on a stick giving his name and address before the fire wiped him out. This became a fashion, and it was taken to mean that the space was preempted.

Toward midnight a black, staggering body of men began to weave through the entrance. They were volunteer fire fighters, looking for a place to throw themselves down and sleep. These men dropped out all along the line and were rolled out of the driveways by the troops.

There was much splendid unselfishness there. Women gave up their blankets and sat up or walked about all night to cover exhausted men who had fought fire until there was no more fight in them.

CHAPTER IV.

TWENTY SQUARE MILES OF WRECK AND RUIN.

Fierce Battle to Save the Famous Ferry Station, the Chief Inlet to and Egress from San Francisco—Fire Tugs and Vessels in the Bay Aid in Heroic Fight—Fort Mason, General Funston's Temporary Headquarters, has Narrow Escape—A Survey of the Scene of Desolation.

WHEN darkness fell over the desolate city at the end of the fourth day of terror, the heroic men who had borne the burden of the fight with the flames breathed their first sigh of relief, for what remained of the proud metropolis of the Pacific coast was safe.

This was but a semi-circular fringe, however, for San Francisco was a city desolate with twenty square miles of its best area in ashes. In that blackened territory lay the ruins of sixty thousand buildings, once worth many millions of dollars and containing many millions more.

The fourth and last day of the world's greatest conflagration had been one of dire calamity and in some respects was the most spectacular of all. On the evening of the third day (Friday) a gale swept over the city from the west, fanned the glowing embers into fierce flames and again started them upon a path of terrible destruction.

The fire which had practically burnt itself out north of Telegraph Hill was revived by the wind and bursting into a blaze crept toward the East, threatening the destruction of the entire water front, including the Union ferry depot, the only means of egress from the devastated city.

The weary firemen still at work in other quarters of the city were hastily summoned to combat the new danger. Hundreds of sailors from United States warships and hundreds of soldiers joined in the battle, and from midnight until dawn men fought fire as never fire had been fought before. Fire tugs drew up along the water front and threw immense streams of water on to the flames of burning factories, warehouses and sheds.

Blocks of buildings were blown up with powder, guncotton, and dynamite, or torn down by men armed with axes and ropes. All night long the struggle continued. Mayor Schmitz and Chief of Police Dinan, although without sleep for forty-eight hours, remained on the scene all night to assist army and navy officers in directing the fight.

At 7 o'clock Saturday morning, April 21, the battle was won. At that hour the fire was burning grain sheds on the water front about half a mile north of the Ferry station, but was confined to a comparatively small area, and with the work of the fireboats on the bay and the firemen on shore, who were using salt water pumped from the bay, prevented the flames from reaching the Ferry building and the docks in that immediate vicinity.

On the north beach the fire did not reach that part of the water front lying west of the foot of Powell street. The fire on the water front was the only one burning. The entire western addition to the city lying west of Van Ness avenue, which escaped the sweep of flame on Friday, was absolutely safe.

Forty carloads of supplies, which had been run upon the belt line tracks near one of the burned wharves, were destroyed during the night.

A survey of the water front Saturday morning showed that everything except four docks had been swept clean from Fisherman's wharf, at the foot of Powell street, to a point around westerly, almost to the Ferry building.

This means that nearly a mile of grain sheds, docks and wharves were added to the general destruction. In the section

north of Market street the ruined district was practically bounded on the west by Van Ness avenue, although in many blocks the flames destroyed squares to the west of that thoroughfare. The Van Ness avenue burned line runs northerly to Greenwich street, which is a few blocks from the bay. Then the boundary was up over Telegraph Hill and down to that portion of the shore that faces Oakland. Practically everything included between Market, Van Ness avenue, Greenwich, and the bay was in ashes.

On the east side of Hyde street hill the fire burned down to Bay street and Montgomery avenue and stopped at that intersection.

Fort Mason was saved only by the most strenuous efforts of soldiers and firemen. It stands just north of the edge of the burned district, the flames having been checked only three blocks away at Greenwich street.

All south of Market street except in the vicinity of the Pacific Mail dock, was gone. This section is bounded on the north by Market street and runs out to Guererro street, goes out that street two blocks, turns west to Dolores, runs west six blocks to about Twenty-second, taking in four blocks on the other side of Dolores. The fire then took an irregular course southward, spreading out as far as Twenty-fifth street and went down that way to the southerly bay shore.

Maj. C. A. Devol, depot quartermaster and superintendent of the transport service, graphically described the conquering of the fire on the water front, in which he played an important part:

"This fire, which ate its way down to the water front early Friday afternoon, was the climax of the whole situation.

"We realized at once that were the water front to go, San Francisco would be shut off from the world, thus paralyzing all transportation faculties for bringing in food and water to the thousands of refugees huddled on the hillsides from Fort Mason to Golden Gate Park. It would have been impossible to either

come in or go out of the city save by row boats and floats, or by the blocked passage overland southward.

"This all-important section of the city first broke into flames in a hollow near Meigg's wharf, about 2 o'clock in the afternoon. The tugs of our service were all busy transporting provisions from Oakland, but the gravity of the situation made it necessary for all of them to turn to fire-fighting.

"The flames ate down into the extensive lumber district, but had not caught the dock line. Behind the dock, adjacent to the Spreckels sugar warehouse and wharf, were hundreds of freight cars. Had these been allowed to catch fire, the flames would have swept down the entire water front to South San Francisco.

"The climax came at Pier No. 9, and it was here that all energies were focused. A large tug from Mare Island, two fire patrol boats, the Spreckels tugs and ten or twelve more, had lines of hose laid into the heart of the roaring furnace and were pumping from the bay to the limit of their capacities.

"About 5 o'clock I was told that the tugs were just about holding their own and that more help would be needed. The Slocum and the McDowell were at once ordered to the spot. I was on board the former and at one time the heat of the fire was so great that it was necessary to play minor streams on the cabin and sides of the vessel to keep it from taking fire. We were in a slip surrounded by flames.

"Our lines of hose once laid to the dockage, we found willing hands of volunteers waiting to carry the hose forward. I saw pale, hungry men, who probably had not slept for two days, hang on to the nozzle and play the stream until they fell from exhaustion. Others took their places and only with a very few exceptions was it necessary to use force to command the assistance of citizens or onlookers.

"All night the flames raged through the lumber district, and the fire reached its worst about 3:30 o'clock Saturday morning. Daylight found it under control."

All that was left of the proud Argonaut city was like a Crescent moon set about a black disk of shadow. A Saharan desolation of blackened, ash covered, twisted debris was all that remained of three-fifths of the city that four days ago stood like a sentinel in glittering, jeweled armor, guarding the Golden Gate to the Pacific.

Men who had numbered their fortunes in the tens of thousands camped on the ruins of their homes, eating as primitive men ate—gnawing; thinking as primitive men thought. Ashes and the dull pain of despair were their portions. They did not have the volition to help themselves, childlike as the men of the stone age, they awaited quiescent what the next hour might bring them.

Fear they had none, because they had known the shape of fear for forty-eight hours and to them it had no more terrors. Men overworked to the breaking point and women unnerved by hysteria dropped down on the cooling ashes and slept where they lay, for had they not seen the tall steel skyscrapers burn like a torch? Had they not beheld the cataracts of flame fleeting unhindered up the broad avenues, and over the solid blocks of the city?

Fire had become a commonplace. Fear of fire had been blunted by their terrible suffering, and although the soldiers roused the sleepers and warned them against possible approaching flames, they would only yawn, wrap their blanket about them and stolidly move on to find some other place where they might drop and again slumber like men dead.

As the work of clearing away the debris progressed it was found that an overwhelming portion of the fatalities occurred in the cheap rooming house section of the city, where the frail hotels were crowded at the time of the catastrophe.

In one of these hotels alone, the five-story Brunswick rooming house at Sixth and Howard streets, it is believed that 300 people perished. The building had 300 rooms filled with guests. It

collapsed to the ground entirely and fire started amidst the ruins scarcely five minutes later.

South of Market street, where the loss of life was greatest, was located many cheap and crowded lodging houses. Among others the caving in of the Royal, corner Fourth and Minna streets, added to the horror of the situation by the shrieks of its many scores of victims imbedded in the ruins.

The collapsing of the Porter House on Sixth street, between Mission and Market, came about in a similar manner. Fully sixty persons were entombed midst the crash. Many of these were saved before the fire eventually crept to the scene.

Part of the large Cosmopolitan House, corner Fifth and Mission streets, collapsed at the very first tremble. Many of the sleepers were buried in the ruins; other escaped in their night clothes.

At 775 Mission street the Wilson House, with its four stories and eighty rooms, fell to the ground a mass of ruins. As far as known very few of the inmates were rescued.

The Denver House on lower Third street, with its many rooms, shared the same fate and none may ever know how many were killed, the majority of the inmates being strangers.

A small two-story frame building occupied by a man and wife at 405 Jessie street collapsed without an instant's warning. Both were killed.

To the north of Market street the rooming-house people fared somewhat better. The Luxemburg, corner of Stockton and O'Farrell streets, a three-story affair, suffered severely from the falling of many tons of brick from an adjoining building. The falling mass crashed through the building, killing a man and woman.

At the Sutter street Turkish baths a brick chimney toppled over and crashing through the roof killed one of the occupants as he lay on a cot. Another close by, lying on another cot, escaped.

RUINS OF CHINATOWN. One of the most noted districts in San Francisco, contained about 25,000 Chinese and was visited by all tourists. It was famous for the system of underground secret passages and cellars.

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CALL BUILDING. EMANUEL SYNAGOGUE. DEWEY'S MONUMENT. FLOOD BUILDING. ST. FRANCIS HOTEL.
BIRD'S EYE VIEW OF SAN FRANCISCO IN RUINS

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Two hundred bodies were found in the Potrero district, south of Shannon street in the vicinity of the Union Iron works, were cremated at the Six-Mile House, on Sunday by the order of Coroner Walsh. Some of the dead were the victims of falling buildings from the earthquake shock, some were killed in the fire.

So many dead were found in this limited area that cremation was deemed absolutely necessary to prevent disease. The names of some of the dead were learned, but in the majority of cases identification was impossible owing to the mutilation of the features.

A systematic search for bodies of the victims of the earthquake and fire was made by the coroner and the state board of health inspectors as soon as the ruins cooled sufficiently to permit a search.

The body of an infant was found in the center of Union street, near Dupont street.

Three bodies were found in the ruins of the house on Harrison street between First and Second streets. They had been burned beyond all possibility of identification. They were buried on the north beach at the foot of Van Ness avenue.

The body of a man was found in the middle of Silver street, between Third and Fourth streets. A bit of burned envelope was found in the pocket of the vest bearing the name "A. Houston."

The total number of bodies recovered and buried up to Sunday night was 500. No complete record can ever be obtained as many bodies were buried without permits from the coroner and the board of health.

Whenever a body was found it was buried immediately without any formality whatever and, as these burials were made at widely separated parts of the city by different bodies of searchers, who did not even make a prompt report to headquarters, considerable confusion resulted in estimating the number of casualties and exaggerated reports resulted.

CHAPTER V.

THE CITY OF A HUNDRED HILLS.

A Description of San Francisco, the Metropolis of the Pacific Coast Before the Fire—One of the Most Beautiful and Picturesque Cities in America—Home of the California Bonanza Kings.

SAN FRANCISCO has had many soubriquets. It has been happily called the "City of a Hundred Hills," and its title of the "Metropolis of the Golden Gate" is richly deserved. Its location is particularly attractive, inasmuch as the peninsula it occupies is swept by the Pacific Ocean on the west and the beautiful bay of San Francisco on the north and east. The peninsula itself is thirty miles long and the site of the city is six miles back from the ocean. It rests on the shore of San Francisco Bay, which, with its branches, covers over 600 square miles, and for beauty and convenience for commerce is worthy of its magnificent entrance—the Golden Gate.

San Francisco was originally a mission colony. It is reported that "the site of the mission of San Francisco was selected because of its political and commercial advantages. It was to be the nucleus of a seaport town that should serve to guard the dominion of Spain in its vicinity. Most of the other missions were founded in the midst of fertile valleys, inhabited by large numbers of Indians." Both of these features were notably absent in San Francisco. Even the few Indians there in 1776 left upon the arrival of the friars and dragoons. Later on some of them returned and others were added, the number increasing from 215 in 1783, to 1,205 in 1813. This was the largest number ever reported. Soon after the number began to decrease through epidemics and emigration, until there was only 204 in 1832.

The commercial life of San Francisco dates from 1835, when William A. Richardson, an Englishman, who had been living in Sausalito since 1822, moved to San Francisco. He erected a tent and began the collection of hides and tallow, by the use of two 30-ton schooners leased from the missions, and which plied between San Jose and San Francisco. At that time Mr. Richardson was also captain of the port.

Seventy-five years ago the white adult males, apart from the Mission colony, consisted of sixteen persons. The local census of 1852 showed a population of 36,000, and ten years later 90,000. The last general census of 1900 credits the city with a population of 343,000. The increase in the last six years has been much greater than for the previous five, and it is generally conceded that the population at the time of the fire was about 425,000.

California was declared American territory by Commodore Sloat, at Monterey, on the 7th of July, 1846, who on that day caused the American flag to be raised in that town. On the following day, under instructions from the commodore, Captain Montgomery, of the war sloop Portsmouth, performed a similar service in Yerba Buena, by which name the city afterwards christened San Francisco was then known. This ceremony took place on the plot of ground, afterward set apart as Portsmouth Square, on the west line of Kearney street, between Clay and Washington. At that time and for some years afterwards, the waters of the bay at high tide, came within a block of the spot where this service occurred. This was a great event in the history of the United States, and it has grown in importance and in appreciative remembrance from that day to the present, as the accumulative evidence abundantly shows.

Referring to the change in name from Yerba Buena to San Francisco, in 1847, a writer says: "A site so desirable for a city, formed by nature for a great destiny on one of the finest bays in the world, looking out upon the greatest, the richest, and the most pacific of oceans—in the very track of empire—in the

healthiest of latitudes—such a site could not fail to attract the attention of the expanding Saxon race. Commerce hastened it, the discovery of gold consummated it."

Modern San Francisco had its birth following the gold discoveries which led to the construction of the Central Pacific railway, and produced a vast number of very wealthy men known by the general title of California Bonanza Kings. San Francisco became the home and headquarters of these multi-millionaires, and large sums of their immense fortunes were invested in palatial residences and business blocks.

The bonanza king residence section was Nob Hill, an eminence near the business part of the city.

In the early days of San Francisco's growth and soon after the Central Pacific railroad had been built by Leland Stanford, Charles Crocker, Mark Hopkins, Collis P. Huntington and the others who devoted the best part of their lives to the project of crossing the mountains by rail this hill was selected as the most desirable spot in the city for the erection of homes for the use of wealthy pioneers.

The eminence is situated northwest of the business section of the city and commands a view of the bay and all adjacent territory with the exception of the Pacific Ocean, Russian Hill, Pacific Heights and several other high spots obscuring the view toward the west.

Far removed above the din and noise of the city Charles Crocker was the first to erect his residence on the top of this historic hill which afterward became known as Nob Hill. The Crocker home was built of brick and wood originally, but in later years granite staircases, pillars and copings were substituted. In its time it was looked upon as the most imposing edifice in the city and for that reason the business associates of the railroad magnate decided to vie with him in the building of their homes.

Directly across from the Crocker residence on California street Leland Stanford caused to be built a residence structure

that was intended to be the most ornate in the western metropolis. It was a veritable palace and it was within its walls that the boyhood days of Leland Stanford, Jr., after whom the university is named, were spent in luxurious surroundings. After the death of the younger Stanford a memorial room was set apart and the parents permitted no one to enter this except a trusted man servant who had been in the family for many years.

But the Stanford residence was relegated to the background as an object of architectural beauty when Mark Hopkins invaded the sacred precincts of Nob Hill and erected the residence which he occupied for three or four years. At his death the palatial building was deeded to the California Art Institute and as a tribute to the memory of the sturdy pioneer the building was called the Hopkins Institute of Art. Its spacious rooms were laden with the choicest works of art on the Pacific coast and the building and its contents were at all times a source of interest to the thousands of tourists who visited the city.

The late Collis P. Huntington was the next of the millionaires of San Francisco to locate upon the crest of Nob Hill. Within a block of the Crocker, Stanford and Hopkins palaces this railroad magnate of the west erected a mansion of granite and marble that caused all the others to be thrown in the shade. Its exterior was severe in its simplicity, but to those who were fortunate to gain entrance to the interior the sight was one never to be forgotten. The palaces of Europe could not excel it and for several years Huntington and his wife were its only occupants aside from the army of servants required to keep the house and grounds in order.

Not to be outdone by the railroad magnates of the city the next to acquire property on the crest of the hill was James Flood, the "bonanza king" and partner with William O'Brien, the names of both being closely interwoven with the early history of California and the Comstock lode. After having paid a visit to the east the millionaire mine owner became impressed with the brown

stone fronts of New York and outdone his neighbors by erecting the only brown stone structure in San Francisco.

It was in this historic hilltop also that James G. Fair laid the foundation of a residence that was intended to surpass anything in the sacred precincts, but before the foundations had been completed domestic troubles resulted in putting a stop to building operations and it is on this site that Mrs. Herman Oelrichs, daughter of the late millionaire mine owner, erected the palatial Fairmont hotel, which was one of the most imposing edifices in San Francisco.

The old San Francisco is dead. The gayest, lightest hearted, most pleasure loving city of this continent, and in many ways the most interesting and romantic, is a horde of huddled refugees living among ruins. But those who have known that peculiar city by the Golden Gate and have caught its flavor of the Arabian Nights feel that it can never be the same. It is as though a pretty, frivolous woman had passed through a great tragedy, She survives, but she is sobered and different. When it rises out of the ashes it will be a modern city, much like other cities and without its old flavor.

The city lay on a series of hills and the lowlands between. These hills are really the end of the Coast Range of mountains which lie between the interior valleys and the ocean to the south. To its rear was the ocean; but the greater part of the town fronted on two sides on San Francisco Bay, a body of water always tinged with gold from the great washings of the mountains, usually overhung with a haze, and of magnificent color changes. Across the bay to the north lies Mount Tamalpais, about 5,000 feet high, and so close that ferries from the waterfront took one in less than half an hour to the little towns of Sausalito and Belvidere, at its foot.

It is a wooded mountain, with ample slopes, and from it on the north stretch away ridges of forest land, the outposts of the great Northern woods of Sequoia semperrirens. This mountain

and the mountainous country to the south brought the real forest closer to San Francisco than to any other American city.

Within the last few years men have killed deer on the slopes of Tamalpais and looked down to see the cable cars crawling up the hills of San Francisco to the north. In the suburbs coyotes still stole and robbed hen roosts by night. The people lived much out of doors. There was no time of the year, except a short part of the rainy season, when the weather kept one from the woods. The slopes of Tamalpais were crowded with little villas dotted through the woods, and those minor estates ran far up into the redwood country. The deep coves of Belvidere, sheltered by the wind from Tamalpais, held a colony of "arks" or houseboats, where people lived in the rather disagreeable summer months, going over to business every day by ferry. Everything invited out of doors.

The climate of California is peculiar; it is hard to give an impression of it. In the first place, all the forces of nature work on laws of their own in that part of California. There is no thunder or lightning; there is no snow, except a flurry once in five or six years; there are perhaps a dozen nights in the winter when the thermometer drops low enough so that there is a little film of ice on exposed water in the morning. Neither is there any hot weather. Yet most Easterners remaining in San Francisco for a few days remember that they were always chilly.

For the Gate is a big funnel, drawing in the winds and the mists which cool off the great, hot interior valleys of the San Joaquin and Sacramento. So the west wind blows steadily ten months of the year and almost all the mornings are foggy. This keeps the temperature steady at about 55 degrees—a little cool for comfort of an unacclimated person, especially indoors. Californians, used to it, hardly ever thought of making fires in their houses except in the few exceptional days of the winter season, and then they relied mainly upon fireplaces. This is like the custom of the Venetians and the Florentines.

But give an Easterner six months of it and he too learns to exist without a chill in a steady temperature a little lower than that to which he is accustomed at home. After that one goes about with perfect indifference to the temperature. Summer and winter San Francisco women wore light tailor-made clothes, and men wore the same fall weight suits all the year around. There is no such thing as a change of clothing for the seasons. And after becoming acclimated these people found the changes from hot to cold in the normal regions of the earth hard to bear. Perhaps once in two or three years there comes a day when there is no fog, no wind and a high temperature in the coast district. Then there is hot weather, perhaps up in the eighties, and Californians grumble, swelter and rustle for summer clothes. These rare hot days were the only times when one saw on the streets of San Francisco women in light dresses.

Along in early May the rains cease. At that time everything is green and bright and the great golden poppies, as large as the saucer of an after dinner coffee cup, are blossoming everywhere. Tamalpais is green to its top; everything is washed and bright. By late May a yellow tinge is creeping over the hills. This is followed by a golden June and a brown July and August. The hills are burned and dry. The fog comes in heavily, too; and normally this is the most disagreeable season of the year. September brings a day or two of gentle rain; and then a change, as sweet and mysterious as the breaking of spring in the East, comes over the hills. The green grows through the brown and the flowers begin to come out.

As a matter of fact, the unpleasantness of summer is modified by the certainty that one can go anywhere without fear of rain. And in all the coast mountains, especially the seaward slopes, the dews and the shelter of the giant underbrush keep the water so that these areas are green and pleasant all summer.

In a normal year the rains begin to fall heavily in November; there will be three or four days of steady downpour and then a

RUINS OF PALACE AND GRAND HOTELS. The Palace Hotel was for years a famous landmark and was valued at over $1,000,000. The Palm Room, Gentlemen's Grill and Empire Parlor were some of its beauty spots. It was one of the largest hotels in the West.

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EVENING POST. MERCHANTS EXCHANGE. MILLS BUILDING.

RUINS OF SAN FRANCISCO AFTER THE FIRE.

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RUINS OF YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING.

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MARK HOPKINS INSTITUTE, NOB HILL.

This Institute which crowned Nob Hill in San Francisco was originally the residence of Mark Hopkins of Central Pacific fame. Nob Hill was noted for Palatial Homes. They were destroyed by the fire.

clear and green week. December is also likely to be rainy; and in this month people enjoy the sensation of gathering for Christmas the mistletoe which grows profusely on the live oaks, while the poppies are beginning to blossom at their feet. By the end of January the rains come lighter. In the long spaces between rains there is a temperature and a feeling in the air much like that of Indian summer in the East. January is the month when the roses are at their brightest.

So much for the strange climate, which invites out of doors and which has played its part in making the character of the people. The externals of the city are—or were, for they are no more—just as curious. One usually entered the city by way of San Francisco Bay. Across its yellow flood, covered with the fleets from the strange seas of the Pacific, San Francisco presented itself in a hill panorama. Probably no other city of the world could be so viewed and inspected at first sight. It rose above the passenger, as he reached dockage, in a succession of hill terraces.

At one side was Telegraph Hill, the end of the peninsula, a height so abrupt that it had a 200 foot sheer cliff on its seaward frontage. Further along lay Nob Hill, crowned with the Mark Hopkins mansion, which had the effect of a citadel, and in later years by the great, white Fairmount. Further along was Russian Hill, the highest point. Below was the business district, whose low site caused all the trouble.

Except for the modern buildings, the fruit of the last ten years, the town presented at first sight a disreputable appearance. Most of the buildings were low and of wood. In the middle period of the 70's, when a great part of San Francisco was building, there was some atrocious architecture perpetrated. In that time, too, every one put bow windows on his house, to catch all of the morning sunlight that was coming through the fog, and those little houses, with bow windows and fancy work all down

their fronts, were characteristic of the middle class residence district.

Then the Italians, who tumbled over Telegraph Hill, had built as they listed and with little regard for streets, and their houses hung crazily on a side hill which was little less than a precipice. For the most part, the Chinese, although they occupied an abandoned business district, had remade the houses Chinese fashion, and the Mexicans and Spaniards had added to their houses those little balconies without which life is not life to a Spaniard.

Yet the most characteristic thing after all was the coloring. For the sea fog had a trick of painting every exposed object a sea gray which had a tinge of dull green in it. This, under the leaden sky of a San Francisco morning, had a depressing effect on first sight and afterward became a delight to the eye. For the color was soft, gentle and infinitely attractive in mass.

The hills are steep beyond conception. Where Vallejo street ran up Russian Hill it progressed for four blocks by regular steps like a flight of stairs. It is unnecessary to say that no teams ever came up this street or any other like it, and grass grew long among the paving stones until the Italians who live thereabouts took advantage of this to pasture a cow or two. At the end of the four blocks, the pavers had given it up and the last stage to the summit was a winding path. On the very top, a colony of artists lived in little villas of houses whose windows got the whole panorama of the bay. Luckily for these people, a cable car climbed the hill on the other side, so that it was not much of a climb to home.

With these hills, with the strangeness of the architecture and with the green gray tinge over everything, the city fell always into vistas and pictures, a setting for the romance which hung over everything, which always hung over life in San Francisco since the padres came and gathered the Indians about Mission Dolores.

And it was a city of romance and a gateway to adventure. It opened out on the mysterious Pacific, the untamed ocean, and most of China, Japan, the South Sea Islands, Lower California, the west coast of Central America, Australia that came to this country passed in through the Golden Gate. There was a sprinkling, too, of Alaska and Siberia. From his windows on Russian Hill one saw always something strange and suggestive creeping through the mists of the bay. It would be a South Sea Island brig, bringing in copra, to take out cottons and idols; a Chinese junk with fanlike sails, back from an expedition after sharks' livers; an old whaler, which seemed to drip oil, back from a year of cruising in the Arctic. Even the tramp windjammers were deep chested craft, capable of rounding the Horn or of circumnavigating the globe; and they came in streaked and picturesque from their long voyaging.

In the orange colored dawn which always comes through the mists of that bay, the fishing fleet would crawl in under triangular lateen sails, for the fishermen of San Francisco Bay were all Neapolitans who brought their customers and their customs and sail with lateen rigs shaped like the ear of a horse when the wind fills them and stained an orange brown.

Along the waterfront the people of these craft met. "The smelting pot of the races," Stevenson called it; and this was always the city of his soul. There are black Gilbert Islanders, almost indistinguishable from negroes; lighter Kanakas from Hawaii or Samoa; Lascars in turbans; thickset Russian sailors; wild Chinese with unbraided hair; Italian fishermen in tam o' shanters, loud shirts and blue sashes; Greeks, Alaska Indians, little bay Spanish-Americans, together with men of all the European races. These came in and out from among the queer craft, to lose themselves in the disreputable, tumbledown, but always mysterious shanties and small saloons. In the back rooms of these saloons South Sea Island traders and captains, fresh from the lands of romance, whaling masters, people who were trying

to get up treasure expeditions, filibusters, Alaskan miners, used to meet and trade adventures.

There was another element, less picturesque and equally characteristic, along the waterfront. For San Francisco was the back eddy of European civilization—one end of the world. The drifters came there and stopped, lingered a while to live by their wits in a country where living after a fashion has always been marvellously cheap. These people haunted the waterfront or lay on the grass on Portsmouth Square.

That square, the old plaza about which the city was built, Spanish fashion, had seen many things. There in the first burst of the early days the vigilance committee used to hold its hangings. There in the time of the sand lot riots Dennis Kearney, who nearly pulled the town down about his ears, used to make his orations which set the unruly to rioting. In these later years Chinatown laid on one side of it and the Latin quarter and the "Barbary Coast" on the other.

On this square men used to lie all day long and tell strange yarns. Stevenson lay there with them in his time and learned the things which he wrote into "The Wrecker" and his South Sea stories, and in the center of the square there stood the beautiful Stevenson monument. In later years the authorities put up a municipal building on one side of this square and prevented the loungers, for decency's sake, from lying on the grass. Since then some of the peculiar character of the old plaza had gone.

The Barbary Coast was a loud bit of hell. No one knows who coined the name. The place was simply three blocks of solid dance halls, there for the delight of the sailors of the world. On a fine busy night every door blared loud dance music from orchestra, steam pianos and gramaphones and the cumulative effect of the sound which reached the street was at least strange. Almost anything might be happening behind the swinging doors. For a fine and picturesque bundle of names characteristic of the place, a police story of three or four years ago is typical. Hell

broke out in the Eye Wink Dance Hall. The trouble was started by a sailor known as Kanaka Pete, who lived in the What Cheer House, over a woman known as Iodoform Kate. Kanaka Pete chased the man had marked to the Little Silver Dollar, where he turned and punctured him. The by-product of his gun made some holes in the front of the Eye Wink, which were proudly kept as souvenirs, and were probably there until it went out in the fire. This was low life, the lowest of the low.

Until the last decade almost anything except the commonplace and the expected might happen to a man on the waterfront. The cheerful industry of shanghaing was reduced to a science. A stranger taking a drink in one of the saloons which hung out over the water might be dropped through the floor into a boat, or he might drink with a stranger and wake in the forecastle of a whaler bound for the Arctic. Such an incident is the basis of Frank Norris's novel, "Moran of the Lady Letty," and although the novel draws it pretty strong, it is not exaggerated. Ten years ago the police and the foreign consuls, working together, stopped this.

Kearney street, a wilder and stranger Bowery, was the main thoroughfare of these people. An exiled Californian, mourning over the city of his heart, said recently:

"In a half an hour of Kearney street I could raise a dozen men for any wild adventure, from pulling down a statue to searching for the Cocos Island treasure."

This is hardly an exaggeration.

These are a few of the elements which made the city strange and gave it the glamour of romance which has so strongly attracted such men as Stevenson, Frank Norris and Kipling. This lay apart from the regular life of the city, which was distinctive in itself.

The Californian is the second generation of a picked and mixed stock. The merry, the adventurous, often the desperate, always the brave, deserted the South and New England in 1849

to rush around the Horn or to try the perils of the plains. They found there already grown old in the hands of the Spaniards younger sons of hildalgos and many of them of the proudest blood of Spain. To a great extent the pioneers intermarried with Spanish women; in fact, except for a proud little colony here and there, the old Spanish blood is sunk in that of the conquering race. Then there was an influx of intellectual French people, largely overlooked in the histories of the early days; and this Latin leaven has had its influence.

Brought up in a bountiful country, where no one really has to work very hard to live, nurtured on adventure, scion of a free and merry stock, the real, native Californian is a distinctive type; so far from the Easterner in psychology as the extreme Southerner is from the Yankee. He is easy going, witty, hospitable, lovable, inclined to be unmoral rather than immoral in his personal habits, and above all easy to meet and to know.

Above all there is an art sense all through the populace which sets it off from any other part of the country. This sense is almost Latin in its strength, and the Californian owes it to the leaven of Latin blood. The true Californian lingers in the north; for southern California has been built up by "lungers" from the East and middle West and is Eastern in character and feeling.

With such a people life was always gay. If they did not show it on the streets, as do the people of Paris, it was because the winds made open cafes disagreeable at all seasons of the year. The gayety went on indoors or out on the hundreds of estates that fringed the city. It was noted for its restaurants. Perhaps the very best for people who care not how they spend their money could not be had there, but for a dollar, 75 cents, 50 cents, a quarter or even 15 cents the restaurants afforded the best fare on earth at the price.

If one should tell exactly what could be had at Coppa's for 50 cents or at the Fashion for, say, 35, no New Yorker who has

not been there would believe it. The San Francisco French dinner and the San Francisco free lunch were as the Public Library to Boston or the stock yards to Chicago. A number of causes contributed to this consummation. The country all about produced everything that a cook needed and that in abundance—the bay was an almost untapped fishing pond, the fruit farms came up to the very edge of the town, and the surrounding country produced in abundance fine meats, all cereals and all vegetables.

But the chefs who came from France in the early days and liked this land of plenty were the head and front of it. They passed on their art to other Frenchmen or to the clever Chinese. Most of the French chefs at the biggest restaurants were born in Canton, China. Later the Italians, learning of this country where good food is appreciated, came and brought their own style. Householders always dined out one or two nights of the week, and boarding houses were scarce, for the unattached preferred the restaurants. The eating was usually better than the surroundings.

Meals that were marvels were served in tumbledown little hotels. Most famous of all the restaurants was the Poodle Dog. There have been no less than four restaurants of this name, beginning with a frame shanty where, in the early days, a prince of French cooks used to exchange ragouts for gold dust. Each succeeding restaurant of the name has moved further downtown; and the recent Poodle Dog stood on the edge of the Tenderloin in a modern five story building. And it typified a certain spirit that there was in San Francisco.

For on the ground floor was a public restaurant where there was served the best dollar dinner on earth. It ranked with the best and the others were in San Francisco. Here, especially on Sunday night, almost everybody went to vary the monotony of home cooking. Every one who was any one in the town could

be seen there off and on. It was perfectly respectable. A man might take his wife and daughter there.

On the second floor there were private dining rooms, and to dine there, with one or more of the opposite sex, was risque but not especially terrible. But the third floor—and the fourth floor —and the fifth. The elevator man of the Poodle Dog, who had held the job for many years and never spoke unless spoken to, wore diamonds and was a heavy investor in real estate. There were others as famous in their way—the Zinka, where, at one time, every one went after the theatre, and Tate's the Palace Grill, much like the grills of Eastern hotels, except for the price; Delmonico's, which ran the Poodle Dog neck and neck in its own line, and many others, humbler but great at the price.

The city never went to bed. There was no closing law, so that the saloons kept open nights and Sundays, at their own sweet will. Most of them elected to remain open until 3 o'clock in the morning at least. Yet this restaurant life did not exactly express the careless, pleasure loving character of the people. In great part their pleasures were simple, inexpensive and out of doors. No people were fonder of expeditions into the country, of picnics—which might be brought off at almost any season of the year—and often long tours in the great mountains and forests. And hospitality was nearly a vice.

As in the early mining days, if they liked the stranger the people took him in. At the first meeting the local man probably had him put up at the club; at the second, he invited him home to dinner. As long as he stayed he was being invited to week end parties at ranches, to little dinners in this or that restaurant and to the houses of his new acquaintances, until his engagements grew beyond hope of fulfillment. There was rather too much of it. At the end of a fortnight a stranger with a pleasant smile and a good story left the place a wreck. This tendency ran through all grades of society—except, perhaps, the sporting

RUINS OF NOB HILL RESIDENCES AND FAIRMOUNT HOTEL. This hotel was planned to be the finest on the coast and was to cost $3,000,000. It was built in residence section on Nob Hill overlooking the Bay.

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EARLY HOURS OF FIRE. The fire department made many valiant efforts to stop the spread of the fire, but the water supply was soon exhausted and then the authorities resorted to blowing up buildings with dynamite. The above picture is in the business district, the Call building in the distance.

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people who kept the tracks and the fighting game alive. These also met the stranger—and also took him in.

Centers of men of hospitality were the clubs, especially the famous Bohemian and the Family. The latter was an offshot of the Bohemian, which had been growing fast and vieing with the older organization for the honor of entertaining pleasing and distinguished visitors.

The Bohemian Club, whose real founder is said to have been the late Henry George, was formed in the '70s by a number of newspaper writers and men working in the arts or interested in them. It had grown to a membership of 750. It still kept for its nucleus painters, writers, musicians and actors, amateur and professional. They were a gay group of men, and hospitality was their avocation. Yet the thing which set this club off from all others in the world was the midsummer High Jinks.

The club owns a fine tract of redwood forest fifty miles north of San Francisco, on the Russian River. There are two varieties of big trees in California: the Sequoia gigantea and the Sequoia sempervirens. The great trees of the Mariposa grove belong to the gigantea species. The sempervirens, however, reaches the diameter of 16 feet, and some of the greatest trees of this species are in the Bohemian Club grove. It lies in a cleft of the mountains; and up one hillside there runs a natural out of door stage of remarkable acoustic properties.

In August the whole Bohemian Club, or such as could get away from business, went up to this grove and camp out for two weeks. And on the last night they put on the Jinks proper, a great spectacle with poetic words, music and effects done by the club, in praise of the forest. In late years this had been practically a masque or an opera. It cost about $10,000. It took the spare time of scores of men for weeks; yet these 700 business men, professional men, artists, newspaper workers, struggled for the honor of helping out on the Jinks; and the whole thing was done naturally and with reverence. It would hardly be

possible anywhere else in this country; the thing which made it possible is the art spirit which is in the Californian. It runs in the blood.

Some one has been cellecting statistics which prove this point. "Who's Who in America" is long on the arts and on learning and comparatively weak in business and the professions. Now some one who has taken the trouble has found that more persons mentioned in "Who's Who" by the thousand of the population were born in Massachusetts than in any other State; but that Massachusetts is crowded closely by California, with the rest nowhere. The institutions of learning in Massachusetts account for her preeminence; the art spirit does it for California. The really big men nurtured on California influence are few, perhaps; but she has sent out an amazing number of good workers in painting, in authorship, in music and especially in acting.

"High Society" in San Francisco had settled down from the rather wild spirit of the middle period; it had come to be there a good deal as it is elsewhere. There was much wealth; and the hills of the western addition were growing up with fine mansions. Outside of the city, at Burlingame, there was a fine country club centering a region of country estates which stretched out to Menlo Park. This club had a good polo team, which played every year with teams of Englishment from southern California and even with teams from Honolulu.

The foreign quarters were worth a chapter in themselves. Chief of these was, of course, Chinatown, of which every one has heard who ever heard of San Francisco. A district six blocks long and two blocks wide, when the quarter was full, housed 30,000 Chinese. The dwellings were old business blocks of the early days; but the Chinese had added to them, rebuilt them, had run out their own balconies and entrances, and had given it that feeling of huddled irregularity which makes all Chinese built dwellings fall naturally into pictures. Not only this, they had burrowed to a depth equal to three stories under the ground,

and through this ran passages in which the Chinese transacted their dark and devious affairs—as the smuggling of opium, the traffic in slave girls and the settlement of their difficulties.

There was less of this underground life than formerly, for the Board of Health had a cleanup some time ago; but it was still possible to go from one end of Chinatown to the other through secret underground passages. The Chinese lived there their own life in their own way. The Chinatown of New York is dull beside it. And the tourist, who always included Chinatown in his itinerary, saw little of the real life. The guides gave him a show by actors hired for his benefit. In reality the place had considerable importance in a financial way. There were clothing and cigar factories of importance, and much of the tea and silk importing was in the hands of the merchants, who numbered several millionaires. Mainly, however, it was a Tenderloin for the house servants of the city—for the San Francisco Chinaman was seldom a laundryman; he was too much in demand at fancy prices as a servant.

The Chinese lived their own lives in their own way and settled their own quarrels with the revolvers of their highbinders. There were two theaters in the quarter, a number of rich joss houses, three newspapers and a Chinese telephone exchange. There is a race feeling against the Chinese among the working people of San Francisco, and no white man, except the very lowest outcasts, lived in the quarter.

On the slopes of Telegraph Hill dwelt the Mexicans and Spanish, in low houses, which they had transformed by balconies into a resemblance of Spain. Above, and streaming over the hill, were the Italians. The tenement quarter of San Francisco shone by contrast with that of New York, for while these people lived in old and humble houses they had room to breathe and a high eminence for light and air. Their shanties clung on the side of the hill or hung on the very edge of the precipice overlooking the bay, on the edge of which a wall kept their babies from falling.

The effect was picturesque, and this hill was the delight of painters. It was all more like Italy than anything in the Italian quarter of New York and Chicago—the very climate and surroundings, wine country close at hand, the bay for their lateen boats, helped them.

Over by the ocean and surrounded by cemeteries in which there are no more burials, there is an eminence which is topped by two peaks and which the Spanish of the early days named after the breasts of a woman. At its foot was Mission Dolores, the last mission planted by the Spanish padres in their march up the coast, and from these hills the Spanish looked for the first time upon the golden bay.

Many years ago some one set up at the summit of this peak a sixty foot cross of timber. Once a high wind blew it down, and the women of the Fair family then had it restored so firmly that it would resist anything. As it is on a hill it must have stood. It has risen for fifty years above the gay, careless, luxuriant and lovable city, in full view from every eminence and from every alley. It must stand now above the desolation of ruins.

CHAPTER VI

SCENES OF TERROR, DEATH AND HEROISM.

Thrilling Escapes and Deeds of Daring—Sublime Bravery and Self-Sacrifice by Men and Women—How the United States Mint and the Treasuries Were Saved and Protected by Devoted Employes and Soldiers—Pathetic Street Incidents—Soldiers and Police Compel Fashionably Attired to Assist in Cleaning Streets—Italians Drench Homes with Wine.

THE week succeeding the quake was a remarkable one in the history of the country. For a day or two the people had been horror-stricken by the tales of suffering and desolation on the Pacific coast, but as the truth became known they arose equal to the occasion.

And not all the large amounts contributed were confined to those ranked as the great and strong of the nation. The laborers, too, banded together and sent large contributions. The members of the United Brotherhood of Carpenters and Joiners of Indianapolis realized their brethren would be in dire need and they sent $10,000. The United Mineworkers sent $1,000, and several other labor organizations were equally generous.

During even the most awful moments of the catastrophe men and women with sublimest heroism faced the most threatening terrors and dangers to assist, to rescue and to save. Everywhere throughout the city scenes of daring, self-sacrifice and bravery were witnessed and thrilling escapes from imminent death aroused enthusiasm as well as horror.

A landmark of San Francisco which escaped destruction, though every building around it was destroyed, is the United States Mint at the corner of Fifth and Mission streets. Harold

French, an employe of the mint, gave a graphic account of how the flames were successfully fought.

"Nearly $200,000,000 in coin and bullion," said Mr. French, "is stored in the vaults of the mint and for the preservation of this prize a devoted band of employes, re-enforced by regular soldiers, fought until the baffled flames fled to the conquest of stately blocks of so-called fireproof buildings.

"For seven hours a sea of fire surged around this grand old federal edifice, attacking it on all sides with waves of fierce heat. Its little garrison was cut off from retreat for hours at a time, had such a course been thought of by those on guard.

"Iron shutters shielded the lower floors, but the windows of the upper story, on which are located the refinery and assay office, were exposed.

"When the fire leaped Mint avenue in solid masses of flames the refinery men stuck to their windows as long as the glass remained in the frames. Seventy-five feet of an inch hose played a slender stream upon the blazing window sill, while the floor was awash with diluted sulphuric acid. Ankle deep in this soldiers and employes stuck to the floor until the windows shattered. With a roar, the tongues of fire licked greedily the inner walls. Blinding and suffocating smoke necessitated the abandonment of the hose and the fighters retreated to the floor below.

"Then came a lull. There was yet a fighting chance, so back to the upper story the fire-fighters returned, led by Superintendent Leach. At length the mint was pronounced out of danger and a handful of exhausted but exultant employes stumbled out on the hot cobblestone to learn the fate of some of their homes."

A number of men were killed while attempting to loot the United States Mint, where $39,000,000 was kept, while thirty-four white men were shot and killed by troops in a raid on the ruins of the burned United States Treasury. Several millions of dollars are in the treasury ruins.

Among the many pathetic incidents of the fire was that of a woman who sat at the foot of Van Ness avenue on the hot sands on the hillside overlooking the bay east of Fort Mason with four little children, the youngest a girl of 3, the eldest a boy of 10.

They were destitute of water, food and money. The woman had fled with her children from a home in flames in the Mission street district and tramped to the bay in the hope of sighting the ship, which she said was about due, of which her husband was the captain.

"He would know me anywhere," she said. And she would not move, although a young fellow gallantly offered his tent back on a vacant lot in which to shelter her children.

In a corner of the plaza a band of men and women were praying, and one fanatic, driven crazy by horror, was crying out at the top of his voice:

"The Lord sent it—the Lord!"

His hysterical crying got on the nerves of the soldiers and bade fair to start a panic among the women and children. A sergeant went over and stopped it by force. All night they huddled together in this hell, with the fire making it bright as day on all sides, and in the morning, the soldiers using their sense again, commandeered a supply of bread from a bakery, sent out another water squad, and fed the refugees with a semblance of breakfast.

A few Chinese made their way into the crowd. They were trembling, pitifully scared, and willing to stop wherever the soldiers placed them.

The soldiers and the police forced every available man in the downtown district to work, no matter where they were found or under what conditions. One party of four finely dressed men that came downtown in an automobile were stopped by the soldiers and were ordered out of the machine and compelled to as-

sist in clearing the debris from Market street. Then the automobile was loaded with provisions and sent out to relieve the hungry people in the parks.

One young man who was pressed into service by the soldiers, came clad in a fashionable summer suit, straw hat and kid gloves.

An incident of the fire in the Latin quarter on the slope of Telegraph Hill is worthy of note. The only available water supply was found in a well dug in early days. At a critical moment the pump suddenly sucked dry and the water in the well was exhausted.

"There is a last chance, boys!" was shouted and Italian residents crashed in their cellar doors with axes and, calling for assistance, began rolling out barrels of red wine.

The cellars gave forth barrel after barrel until there was fully 500 gallons ready for use. Then barrel heads were smashed in and the bucket brigade turned from water to wine. Sacks were dipped in the wine and used for beating out the fire. Beds were stripped of their blankets and these were soaked in the wine and hung over the exposed portions of the cottages and men on the roofs drenched the shingles and sides of the house with wine.

Past huddled groups of sleepers an unending stream of refugees was seen wending their way to the ferry, dragging trunks over the uneven pavement by ropes tethered to wheelbarrows laden with the household lares and penates. The bowed figures crept about the water and ruins and looked like the ghosts about the ruins of Troy, and unheeding save where instinct prompted them to make a detour about some still burning heap of ruins.

At the ferry the sleepers lay in windrows, each man resting his head upon some previous treasures that he had brought from his home. No one was able to fear thieves or to escape pillage, because of absolute physical inertia forced upon him.

Mad, wholly stark mad, were some of the unfortunates who had not fled from the ruins. In many instances the soldiers were forced to tear men and women away from the bodies of their

dead. Two women were stopped within a distance of a few blocks and forced to give up the dead bodies of their babes, which they were nursing to their bosoms.

A newsgatherer passing through Portsmouth square noticed a mother cowering under a bush. She was singing in a quavering voice a lullaby to her baby. The reporter parted the bushes and looked in. Then he saw what she held in her arms was only a mangled and reddened bit of flesh. The baby had been crushed when the shock of earthquake came and its mother did not know that its life had left it thirty hours before.

When law and order were strained a crew of hell rats crept out of their holes and in the flamelight plundered and reveled in bacchanalian orgies like the infamous inmates of Javert in "Les Miserables." These denizens of the sewer traps and purlieus of "The Barbary Coast" exulted in unhindered joy of doing evil.

Sitting crouched among the ruins or sprawling on the still warm pavement they could be seen brutally drunk. A demijohn of wine placed on a convenient corner of some ruin was a shrine at which they worshiped. They toasted chunks of sausage over the dying coals of the cooling ruin even as they drank, and their songs of revelry were echoed from wall to wall down in the burnt Mission district.

Some of the bedizened women of the half world erected tents and champagne could be had for the asking, although water had its price. One of these women, dressed in pink silk with high heeled satin slippers on her feet, walked down the length of what had been Natoma street with a bucket of water and a dipper, and she gave the precious fluid freely to those stricken ones huddled there by their household goods and who had not tasted water in twenty-four hours.

"Let them drink and be happy," said she, "water tastes better than beer to them now."

Soon after the earthquake San Francisco was practically placed under martial law with Gen. Fred Funston commanding and later Gen. Greely. The regiment has proven effective in subduing anarchy and preventing the depredations of looters. A detail of troops helped the police to guard the streets and remove people to places of safety.

The martial law dispensed was of the sternest. They have no records existing of the number of executions which had been meted out to offenders. It is known that more than one sneaking vandal suffered for disobedience of the injunction given against entering deserted houses.

There was a sharp, businesslike precision about the American soldier that stood San Francisco in good stead. The San Francisco water rat thug and "Barbary Coast" pirate might flout a policeman, but he discovered that he could not disobey a man who wears Uncle Sam's uniform without imminent risk of being counted in that abstract mortuary list usually designated as "unknown dead."

For instance: When Nob Hill was the crest of a huge wave of flame, soldiers were directing the work of saving the priceless art treasures from the Mark Hopkins institute.

Lieut. C. C. McMillan of the revenue cutter Bear impressed volunteers at the point of a pistol to assist in saving the priceless art treasures which the building housed.

"Here you," barked Lieutenant McMillan to the great crowd of dazed men, "get in there and carry out those paintings."

"What business have you got to order us about?" said a burly citizen with the jowl of a Bill Sykes.

The lieutenant gave a significant hitch to his arm and the burly man saw a revolver was hanging from the forefinger of the lieutenant's right hand.

"Look here," said the lieutenant. "You see this gun? Well, I think it is aimed at your right eye. Now, come here. I want to have a little talk with you."

The tough stared for a moment and then the shade of fear crept over his face, and with an "All right, boss," he started in upon the labor of recovering the art treasures from the institute.

"This is martial law," said the determined lieutenant. "I don't like it, you may not like it, but it goes. I think that is understood."

John H. Ryan and wife of Chicago after spending their honeymoon in Honolulu and Jamaica reached San Francisco just before the earthquake. They were stopping at the St. Francis Hotel, which was destroyed partially by the earthquake and totally by the fire following the shock. They lost many of their personal effects, but are thankful that they escaped with their lives.

"When the first shock came," said Mr. Ryan, "I was out of bed in an instant. I immediately was thrown to the floor. Arising, I held on by a chair and by the door knob until I could get around the room to the window to see if I could find out what was the matter. I saw people running and heard them in the corridors of the hotel. I also heard women screaming. I hastily called one of my friends and he and myself threw on our overcoats, stuck our feet into our shoes and ran downstairs. I ran back to tell my wife, when I found her coming down the stairs.

"The first shock lasted, according to a professor in the universixty, sixty seconds. I thought it lasted about as many days.

"At the second shock all the guests piled into the streets. We stood in the bitter cold street for fully a quarter of an hour with nothing about us but our spring overcoats. I said 'bitter cold.' So it was. People there said it was the coldest spell that has struck Frisco in years.

"After standing in the streets for a while my friend and myself, with my wife, started back into the hotel to get our clothes. The guard was at the foot of the stairs and he told us that we would not be allowed to go to our rooms. I told him we merely wanted to get some clothes on so we would not freeze to death

and he told us to go up, but to come right down as soon as possible, for there was no telling what would happen. We rushed into our rooms and hurriedly threw on our clothes, and started out to reconnoiter. We stopped near a small building. Just then a policeman on guard came up and ordered everybody to assist in rescuing the persons within. We did not hesitate, but rushed into the building heedless of the impending falling of the walls. We found there a man lying unconscious on the floor. He revived sufficiently to make us understand that his wife and child were in the building and that he thought they were dead. We looked and finally found them, dead.

"We saw ambulances and undertakers' wagons by the score racing down Market street. They were filled with the bodies of the injured and in many cases with dead. The injured were piled into the wagons indiscriminately without respect for any consequences in the future of the patients."

R. F. Lund of Canal Dover, O., was asleep in apartments when the shock rent the city. "I awoke to find myself on the floor," said Mr. Lund. "The building to me seemed to pitch to the right, then to the left, and finally to straighten itself and sink. I had the sensation of pitching down in an elevator shaft—that sudden, sickening wave that sweeps over you and leaves you breathless.

"I got into my clothes and with some difficulty wrenched open the door of my room. Screams of women were piercing the air. Together with a dozen other men, inmates of the apartments, I assembled the women guests and we finally got them into the streets. Few of them tarried long enough to dress. We went back again and then returned with more women.

"In one room particularly there was great commotion. It was occupied by two women and they were in a state of hysterical terror because they could not open their door and get out. The sudden settling of the building had twisted the jambs.

"Finally I put my two hundred and thirty pounds of weight

against the panels and smashed them through. I helped them wrap themselves in quilts and half led, half carried them to the street.

"While passing through a narrow street in the rear of the Emporium I came upon a tragedy. A rough fellow, evidently a south of Market street thug, was bending over the unconscious form of a woman. She was clothed in a kimono and lay upon the sidewalk near the curb. His back was toward me. He was trying to wrench a ring from her finger and he held her right wrist in his left hand. A soldier suddenly approached. He held a rifle thrust forward and his eyes were on the wretch.

"Involuntarily I stopped and involuntarily my hand went to my hip pocket. I remember only this, that it seemed in that moment a good thing to me to take a life. The soldier's rifle came to his shoulder. There was a sharp report and I saw the smoke spurt from the muzzle. The thug straightened up with a wrench, he shot his right arm above his head and pitched forward across the body of the woman. He died with her wrist in his grasp. It may sound murderous, but the feeling I experienced was one of disappointment. I wanted to kill him myself.

"Along in the afternoon in my walking I came upon a great hulking fellow in the act of wresting food from an old woman and a young girl who evidently had joined their fortunes. No soldiers were about and I had the satisfaction of laying him out with the butt of my pistol. He went down in a heap. I did not stay to see whether or not he came to."

"Strange is the scene where San Francisco's Chinatown stood," said W. W. Overton, after reaching Los Angeles among the refugees. "No heap of smoking ruins marks the site of the wooden warrens where the slant-eyed men of the orient dwelt in thousands. The place is pitted with deep holes and seared with dark passageways, from whose depths come smoke wreaths. All the wood has gone and the winds are streaking the ashes.

"Men, white men, never knew the depth of Chinatown's un-

derground city. "They often talked of these subterranean runways. And many of them had gone beneath the street levels, two and three stories. But now that Chinatown has been unmasked, for the destroyed buildings were only a mask, men from the hillside have looked on where its inner secrets lay. In places they can see passages 100 feet deep.

"The fire swept this Mongolian section clean. It left no shred of the painted wooden fabric. It ate down to the bare ground and this lies stark, for the breezes have taken away the light ashes. Joss houses and mission schools, grocery stores and opium dens, gambling hells and theaters—all of them went. The buildings blazed up like tissue paper lanterns used when the guttering candles touched their sides."

"From this place I, following the fire, saw hundreds of crazed yellow men flee. In their arms they bore their opium pipes, their money bags, their silks, and their children. Beside them ran the baggy trousered women, and some of them hobbled painfully.

"These were the men and women of the surface. Far beneath the street levels in those cellars and passageways were many others. Women who never saw the day from their darkened prisons and their blinking jailors were caught like rats in a huge trap. Their bones were eaten by the flames.

"And now there remain only the holes. They pit the hillside like a multitude of ground swallow nests. They go to depths which the police never penetrated. The secrets of those burrows will never be known, for into them the hungry fire first sifted its red coals and then licked eagerly in tongues of creeping flames, finally obliterating everything except the earth itself."

"The scenes to be witnessed in San Francisco were beyond description," said Mr. Oliver Posey, Jr.

"Not alone did the soldiers execute the law. One afternoon, in front of the Palace Hotel, a crowd of workers in the ruins discovered a miscreant in the act of robbing a corpse of its jewels. Without delay he was seized, a rope was procured, and he was

immediately strung up to a beam which was left standing in the ruined entrance of the Palace Hotel.

"No sooner had he been hoisted up and a hitch taken in the rope than one of his fellow criminals was captured. Stopping only to secure a few yards of hemp, a knot was quickly tied and the wretch was soon adorning the hotel entrance by the side of the other dastard."

Jack Spencer, well known here, also returned home yesterday, and had much to say of the treatment of those caught in the act of rifling the dead of their jewels.

"At the corner of Market and Third streets on Wednesday," said Mr. Spencer of Los Angeles, "I saw a man attempting to cut the fingers from the hand of a dead woman in order to secure the rings. Three soldiers witnessed the deed at the same time and ordered the man to throw up his hands. Instead of obeying he drew a revolver from his pocket and began to fire without warning.

"The three soldiers, reinforced by half a dozen uniformed patrolmen, raised their rifles to their shoulders and fired. With the first shots the man fell, and when the soldiers went to the body to dump it into an alley eleven bullets were found to have entered it."

Here is an experience typical of hundreds told by Sam Wolf, a guest at the Grand Hotel:

"When I awakened the house was shaken as a terrier would shake a rat. I dressed and made for the street which seemed to move like waves of water. On my way down Market street the whole side of a building fell out and came so near me that I was covered and blinded by the dust. Then I saw the first dead come by. They were piled up in an automobile like carcasses in a butcher's wagon, all over blood, with crushed skulls and broken limbs, and bloody faces.

"A man cried out to me, 'Look out for that live wire.' I just had time to sidestep certain death. On each side of me the fires

were burning fiercely. I finally got into the open space before the ferry. The ground was still shaking and gaping open in places. Women and children knelt on the cold asphalt and prayed God would be merciful to them. At last we got on the boat. Not a woman in that crowd had enough clothing to keep her warm, let alone the money for fare. I took off my hat, put a little money in it, and we got enough money right there to pay all their fares."

W. H. Sanders, consulting engineer of the United States geological survey, insisted on paying his hotel bill before he left the St. Francis. He says:

"Before leaving my room I made my toilet and packed my grip. The other guests had left the house. As I hurried down the lobby I met the clerk who had rushed in to get something. I told him I wanted to pay my bill. 'I guess not,' he said, 'this is no time for settlement.'

"As he ran into the office I cornered him, paid him the money, and got his receipt hurriedly stamped."

Dr. Taggart of Los Angeles, a leader of the Los Angeles relief bureau, accidentally shot himself while entering a hospital at the corner of Page and Baker streets, Saturday, April 21. He was mounting the stairs, stumbled and fell. A pistol which he carried in his inside coat pocket was discharged, the bullet entering near the heart. He rose to his feet and cried, "I am dying," and fell into the arms of a physician on the step below. Death was almost instantaneous.

Mrs. Lucien Shaw, of Los Angeles, wife of Judge Shaw of the State Supreme Court, disappeared in the war of the elements that raged in San Francisco.

At day dawn Thursday morning, April 19, the Shaw apartments, on Pope street, San Francisco, were burned. Mrs. Shaw fled with the refugees to the hills.

Judge Lucien Shaw went north on that first special on Wednesday that cleared for the Oakland mole.

Thursday morning at daybreak he reached his apartments on

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CHINESE REFUGEES IN WASHINGTON SQUARE PARK.

It was estimated that as many as 10,000 Chinese were in this park at the time this photograph was taken.

FLAT BUILDING SUNK INTO EARTH.

A view of the great fissures in earth caused by earthquake. One story of the flat building on corner sunk into the ground, The water main was broken, which cut off the water supply. No water to fight the fire or quench the thirst.

Pope street. Flames were burning fiercely. A friend told him that his wife had fled less than fifteen minutes before. She carried only a few articles in a hand satchel.

For two days and nights Judge Shaw wandered over hills and through the parks about San Francisco seeking among the 200,000 refugees for his wife.

During that heart-breaking quest, according to his own words, he had "no sleep, little food and less water." At noon Saturday he gave up the search and hurried back to Los Angeles, hoping to find that she had arrived before him. He hastened to his home on West Fourth street.

"Where's mother?" was the first greeting from his son, Hartley Shaw.

Judge Shaw sank fainting on his own doorstep. The search for the missing woman was continued but proved fruitless.

One of the beautiful little features on the human side of the disaster was the devotion of the Chinese servants to the children of the families which they served. And this was not the only thing, for often a Chinaman acted as the only man in families of homeless women and children. Except for the inevitable panic of the first morning, when the Chinese tore into Portsmouth square and fought with the Italians for a place of safety, the Chinese were orderly, easy to manage, and philosophical. They staggered around under loads of household goods which would have broken the back of a horse, and they took hard the order of the troops which commanded all passengers to leave their bundles at the ferry.

A letter to a friend in Fond du Lac, Wis., from Mrs. Bragg, wife of General E. S. Bragg, late consul general at Hong Kong, and one-time commander of the Iron Brigade, gave the following account of the escape of the Braggs in the Frisco quake. Mrs. Bragg says under date of April 20:

"We reached San Francisco a week ago today, but it seems a month, so much have we been through. We were going over to

Oakland the very morning of the earthquake, so, of course, we never went, as it is as bad there as here.

"General Bragg had to wait to collect some money on a draft, but the banks were all destroyed. The chimneys fell in and all hotels were burned as well as public buildings. There was no water to put out the fires which raged for blocks in every square and provisions were running low everywhere. Eggs were $5 a dozen, etc.; no telegraph, no nothing.

"We went from the Occidental to the Plymouth and from there to the Park Nob hill, where we lay, not slept, all Wednesday night, the day of the earthquake. From there we took refuge on the Pacific with friends who were obliged to get out also and we all came over together to Fort Mason, leaving there last night. We came from there to the flagship Chicago, the admiral having sent a boat for us.

"General Bragg is very well and we have both stood it wonderfully. The Chicago fire was bad enough, but this is worse in our old age. May we live till we reach home. So many here have lost everything, homes as well, we consider ourselves quite fortunate. May I never live to see another earthquake.

"The General had a very narrow escape from falling plaster; never thought to leave the first hotel alive. Many were killed or burned. God is good to us. Our baggage was rescued by our nephews alone. No one else's was to be got out for love or money. The baggage was sent to the Presidio, not four miles from us."

CHAPTER VII.

THRILLING PERSONAL EXPERIENCES.

Scenes of Horror and Panic Described by Victims of the Quake Who Escaped—How Helpless People Were Crushed to Death by Falling Buildings and Debris—Some Marvelous Escapes.

THE stories of hundreds who experienced the earthquake shock but escaped with life and limb constitute a series of thrilling stories unrivalled outside of fiction. Those that contain the most marvellous features are herewith narrated:

Albert H. Gould, of Chicago, describes the scene in the Palace Hotel following the first quake:

"I was asleep on the seventh floor of the Palace Hotel," he said, "at the time of the first quake. I was thrown out of my bed and half way across the room.

"Immediately realizing the import of the occurrence, and fearing that the building was about to collapse, I made my way down the six flights of stairs and into the main corridor.

"I was the first guest to appear. The clerks and hotel employes were running about as if they were mad. Within two minutes after I had appeared other guests began to flock into the corridor. Few if any of them wore other than their night clothing. Men, women, and children with blanched faces stood as if fixed. Children and women cried, and the men were little less affected.

"I returned to my room and got my clothing, then walked to the office of the Western Union in my pajamas and bare feet to telegraph to my wife in Los Angeles. I found the telegraphers there, but all the wires were down. I sat down on the sidewalk,

picked the broken glass out of the soles of my feet, and put on my clothes.

"All this, I suppose, took little more than twenty minutes. Within that time, below the Palace the buildings for more than three blocks were a mass of flames, which quickly communicated to other buildings. The scene was a terrible one. Billows of fire seemed to roll from the business blocks soon half consumed to other blocks in the vicinity, only to climb and loom again.

"The Call building at the corner of Third and Market streets, as I passed, I saw to be more than a foot out of plumb and hanging over the street like the leaning tower of Pisa.

"I remained in San Francisco until 8 o'clock and then took a ferry for Oakland, but returned to the burning city an hour and a half later. At that time the city seemed doomed. I remained but for a few minutes; then made my way back to the ferry station.

"I hope I may never be called upon to pass through such an experience again. People by the thousands and seemingly devoid of reason were crowded around the ferry station. At the iron gates they clawed with their hands as so many maniacs. They sought to break the bars, and failing in that turned upon each other. Fighting my way to the gate like the others the thought came into my mind of what rats in a trap were. Had I not been a strong man I should certainly have been killed."

"When the ferry drew up to the slip, and the gates were thrown open the rush to safety was tremendous. The people flowed through the passageway like a mountain torrent that, meeting rocks in its path, dashes over them. Those who fell saved themselves as best they could.

"I left Oakland at about 5 o'clock. At that time San Francisco was hidden in a pall of smoke. The sun shone brightly upon it without any seeming penetration. Flames at times cleft the darkness. This cloud was five miles in height, and at its top changed into a milk white."

Mrs. Agnes Zink, Hotel Broadway, said:

"I was stopping at 35 Fifth street, San Francisco. The rear of that house collapsed and the landlady and about thirty of her roomers were killed. I escaped simply because I had a front room and because I got out on the roof, as the stairway had collapsed in the rear. Out in the street it was impossible to find a clear pathway. I saw another lodging house near ours collapse —I think it must have been 39 Fifth street—and I know all the inmates were killed, for its wreck was complete. In ten minutes the entire block to Mission street was in flames."

Mr. J. P. Anthony, a business man who escaped from the doomed city in an automobile tells a graphic story:

Mr. Anthony says that he was sleeping in his room at the Romona hotel on Ellis street, near Macon, and was suddenly awakened at 5:23 in the morning. The first shock that brought him out of bed, he says, was appalling in its terrible force. The whole earth seemed to heave and fall. The building where he was housed, which is six stories high, was lifted from its foundation and the roof caved in. A score or more of guests, men and women, immediately made their way to the street, which was soon filled with people, and a perfect panic ensued. Debris showered into the street from the buildings on every side.

As a result, Mr. Anthony says, he saw a score or more of people killed. Women became hysterical and prayed in the streets, while men sat on the curbing, appearing to be dazed. It was twenty minutes before those in the vicinity seemed to realize the enormity of the catastrophe. The crowds became larger and in the public squares of the city and in empty lots thousands of people gathered.

It was 9 o'clock before the police were in control of the situation. When they finally resumed charge, the officers directed their energy toward warning the people in the streets away from danger. Buildings were on the brink of toppling over.

Mr. Anthony says he was walking on Market street, near the Emporium, about 9 a. m., when a severe shock was felt. At once the street filled again with excited persons, and thousands were soon gathered in the vicinity, paralyzed with fear. Before the spectators could realize what had happened, the walls of the building swayed a distance of three feet. The thousands of bystanders stood as if paralyzed, expecting every moment that they would be crushed, but another tremor seemed to restore the big building to its natural position.

Mr. Anthony said that he momentarily expected that, with thousands of others who were in the neighborhood, he would be crushed to death in a few moments. He made his way down Market street as far as the Call building, from which flames were issuing at every window, with the blaze shooting through the roof. A similar condition prevailed in the Examiner building, across the street.

He then started for the depot, at Third and Townsend streets, determined to leave the city. He found a procession of several thousand other persons headed in the same direction.

All south of Market street about that time was a crackling mass of flames. Mr. Anthony made his way to Eighth and Market, thence down Eighth to Townsend and to Third street, and the entire section which he traversed was afire, making it impossible for him to reach his destination. He attempted to back track, but found that his retreat had been cut off by the flames. He then went to Twelfth street and reached Market again by the city hall. San Francisco's magnificent municipal building had concaved like an egg shell. The steel dome was still standing, but the rest of the $3,000,000 structure was a mass of charred ruins.

It was not yet noon, but the city's hospitals were already filled with dead and injured, and all available storerooms were being pressed into service. Dead bodies were being carried from the streets in garbage wagons. In every direction hysterical women

were seen. Men walked through the streets, weeping, and others wore blanched faces. Transfer men were being offered fabulous sums to remove household goods, even for a block distant. Horses had been turned loose and were running at large to prevent their being incinerated in the burning buildings. Women had loaded their personal belongings on carts and were pulling them through the city, the property being huddled in the public squares.

"The Grand Hotel tossed like a ship at sea. There was a wavelike motion, accompanied by a severe up and down shake," said J. R. Hand of the Hand Fruit Company of Los Angeles. "The shock was accompanied by a terrific roar that is indescribable. An upright beam came through the floor of my room and the walls bulged in. I thought I should not get out alive. All my baggage was lost, but I still have the key to my room as a souvenir, No. 249.

"I was on the third story of the hotel and got the last vacant room. No one in any of the stronger built hotels was killed, to the best of my knowledge. These hotels were destroyed by fire after being severely wrecked. I reached the ferry station by a trip of about six miles around by the Fairmount Hotel and thence to the water front.

"The Examiner Building went up like a flash. I was standing in front of the Crocker Building and saw the first smoke. Just then the soldiers ran us out. We went around two blocks and the next view we had the building was a mass of flames. The burning of the Palace was a beautiful sight from the bay."

F. O. Popenie, manager of the Pacific Monthly, was asleep in the Terminus hotel, near the Southern Pacific ferry station, when the first tremble came.

"The Terminus hotel did not go down at the first shock," he said. "We were sleeping on the third floor when the quake came. The walls of the hotel began falling, but the guests had time to run outside before the building fell in.

"I started for San Jose on foot. When I reached the Potrero I looked back and saw the business section a furnace. Fires had started up in many places and were blazing fiercely. Finally a man driving a single rig overtook me. He was headed for San Jose and he took me in. After a distance of fifteen miles we took the train and went on."

The Terminus hotel was a six-story structure with stone and brick sides. It collapsed soon after the first shock.

Among the refugees who found themselves stranded were John Singleton, a Los Angeles millionaire, his wife and her sister. The Singletons were staying at the Palace hotel when the earthquake shock occurred.

Mr. Singleton gives the following account of his experience: "The shock wrecked the rooms in which we were sleeping. We managed to get our clothes on and get out immediately. We had been at the hotel only two days and left probably $3,000 worth of personal effects in the room.

"After leaving the Palace we secured an express wagon for $25 to take us to the Casino, near Golden Gate Park, where we stayed Wednesday night. On Thursday morning we managed to get a conveyance at enormous cost and spent the entire day in getting to the Palace. We paid $1 apiece for eggs and $2 for a loaf of bread. On these and a little ham we had to be satisfied."

"I was asleep in the Hotel Dangham, Ellis and Mason streets, when the shock came," said Miss Bessie Tannehill of the Tivoli Theatre. "There were at least 100 persons in the building at the time. At the first shock I leaped from the bed and ran to the window. Another upheaval came and I was thrown off my feet. I groped my way out of the room and down the dark stairway. Men, women and children, almost without clothing, crowded the place, crying and praying as they rushed out.

"When outside I saw the streets filled with people who rushed about wringing their hands and crying. Proprietor Lisser of the hotel offered a cabman $50 to take himself and his wife to the

Presidio heights, but he refused. He wanted more money. We finally secured a carriage by paying $100. Fire was raging at this time and people were panic-stricken.

"After getting outside of the danger region I walked back, hoping to aid some of the unfortunates. I have heard about big prices charged for food. I wish to testify that the merchants on upper Market street and in near-by districts threw open their stores and invited the crowds to help themselves. The mobs rushed into every place, carrying out all the goods possible.

"I saw many looters and pickpockets at work. On Mason street a gang of thieves was at work. They were pursued by troops, but escaped in an auto."

The members of the Metropolitan opera company of New York were all victims of the great disaster, including Mme. Sembrich, Signor Caruso, Campanari, Dippel, Conductor Hertz and Bars.

All of the splendid scenery, stage fittings, costumes and musical instruments were lost in the fire which destroyed the Grand Opera House, where their season had just opened.

No one of the company was injured, but nearly all of them lost their personal effects. Mme. Sembrich placed the loss by the destruction of her elegant costumes at $20,000. She was fortunate enough to save her valuable jewels. The total loss to the organization was $150,000.

On the morning of the earthquake the members of the company were distributed among the different hotels.

The sudden shock brought all out of their bedrooms in all kinds of attire. The women were in their night dresses, the men in pajamas, none pausing to dress, all convinced that their last hour had come. Ten minutes later Caruso was seen seated on his valise in the middle of the street. Many of the others had rushed to open squares or other places of supposed safety. Even then it was difficult to avoid the debris falling from the crumbling walls.

Several of those stopping at the Oaks were awakened by plaster from the ceilings falling on their bed and had barely time to flee for their lives. One singer was seen standing in the street, barefoot, and clad only in his underwear, but clutching a favorite violin which he carried with him in his flight. Rossi, though almost in tears, was heard trying his voice at a corner near the Palace hotel.

A. W. Hussey, who went to the Hall of Justice on the morning of the disaster, told how at the direction of a policeman whom he did not know, he had cut the arteries in the wrists of a man pinioned under timbers at St. Katherine hotel.

According to the statement made by Hussey the man was begging to be killed and the policeman shot at him, but his aim was defective and the bullet went wide of the mark. The officer then handed Hussey a knife with instructions to cut the veins in the suffering man's wrists, and Hussey obeyed orders to the letter.

A story was told of one young girl who had followed for two days the body of her father, her only relative. It had been taken from a house in Mission street to an undertaker's shop just after the quake. The fire drove her out with her charge, and it was placed in Mechanics' Pavilion.

That went, and it had rested for a day at the Presidio, waiting burial. With many others she wept on the border of the burial area, while the women cared for her. That was truly a tragic and pathetic funeral.

In the commission house of C. D. Bunker a rescuer named Baker was killed while trying to get a dead body from the ruins. Other rescuers heard the pitiful wail of a little child, but were unable to get near the point from which the cry issued. Soon the onrushing fire ended the cry and the men turned to other tasks.

Hundreds of firemen and rescuers were prostrated, the strain of the continued fight in the face of the awful calamity proving more than any man could stand. In the crowds at many points

people fainted and in some instances dropped dead as the result of the reaction following the unprecedented shock.

At Mechanics' Pavilion scenes of heroism and later of panic were enacted. The great frame building was turned into a hospital for the care of the injured and here a corps of fifty physicians rendered aid. Nurses volunteered their services and also girls from the Red Cross ship that steamed in from the government yards at Mare island and contributed doctors and supplies.

While the ambulances and automobiles were unloading their maimed and wounded at the building the march of the conflagration up Market street gave warning that the injured would have to be removed at once.

This work was undertaken and every available vehicle was pressed into service to get the stricken into the hospitals and private houses of the western addition. A few minutes after the last of the wounded had been carried through the door, some on cots, others in strong arms and on stretchers, shafts of fire shot from the roof and the structure burst into a whirlwind of flame.

One of the most thrilling of all stories related of adventures in stricken San Francisco during the days of horror and nights of terror is that of a party of four, two women and two men, who arrived at Los Angeles April 20, after having spent a night and the greater portion of two days on the hills about Golden Gate Park.

This party was composed of Mrs. Francis Winter, Miss Bessie Marley, Dr. Ernest W. Fleming, and Oliver Posey, all of Los Angeles.

"I was sleeping in a room on the third floor of the hotel," said Dr. Fleming, "when the first shock occurred. An earthquake in San Francisco was no new sensation to me. I was there in 1868, when a boy ten years old, when the first great earthquake came. But that was a gentle rocking of a cradle to the one of Wednesday.

"I awoke to the groaning of timbers, the grinding, creaking

sound, then came the roaring street. Plastering and wall decorations fell. The sensation was as if the buildings were stretching and writhing like a snake. The darkness was intense. Shrieks of women, higher, shriller than that of the creaking timbers, cut the air. I tumbled from the bed and crawled, scrambling toward the door. The twisting and writhing appeared to increase. The air was oppressive. I seemed to be saying to myself, will it never, never stop? I wrenched the lock; the door of the room swung back against my shoulder. Just then the building seemed to breathe, stagger and right itself.

"But I fled from that building as from a falling wall. I could not believe that it could endure such a shock and still stand.

"The next I remember I was standing in the street laughing at the unholy appearance of half a hundred men clad in pajamas —and less.

"The women were in their night robes; they made a better appearance than the men.

"The street was a rainbow of colors in the early morning light. There was every stripe and hue of raiment never intended to be seen outside the boudoir.

"I looked at a man at my side; he was laughing at me. Then for the first time I became aware that I was in pajamas myself. I turned and fled back to my room.

"There I dressed, packed my grip, and hastened back to the street. All the big buildings on Market street toward the ferry were standing, but I marked four separate fires. The fronts of the small buildings had fallen out into the streets and at some places the debris had broken through the sidewalk into cellars.

" I noticed two women near me. They were apparently without escort. One said to the other, 'What wouldn't I give to be back in Los Angeles again.'

"That awakened a kindred feeling and I proffered my assistance. I put my overcoat on the stone steps of a building and told them to sit there.

"In less than two minutes those steps appeared to pitch everything forward, to be flying at me. The groaning and writhing started afresh.

"But I was just stunned. I stood there in the street with debris falling about me. It seemed the natural thing for the tops of buildings to careen over and for fronts to fall out. I do not even recall that the women screamed.

"The street gave a convulsive shudder and the buildings somehow righted themselves again. I thought they had crashed together above my head.

"The air was filled with the roar of explosions. They were dynamiting great blocks. Sailors were training guns to rake rows of residences.

"All the while we were moving onward with the crowd. Cinders were falling about us. At times our clothing caught fire, just little embers that smoked and went out. The sting burned our faces and we used our handkerchiefs for veils.

"Everybody around us was using some kind of cloth to shield their eyes. It looked curious to see expressmen and teamsters wearing those veils.

"Quite naturally we seemed to come to Golden Gate Park. It seemed as if we had started for there. By this time the darkness was settling. But it was a weird twilight. The glare from the burning city threw a kind of red flame and shadow about us. It seemed uncanny; the figures about us moved like ghosts.

"The wind and fog blew chill from the ocean and we walked about to keep warm. Thousands were walking about, too, but there was no disturbance.

"Families trudged along there. There was no hurry. All appeared to have time to spare. The streets, walks, and lawns were wiggling with little parties, one or two families in each. The men had brought bedding and blankets and they made impromptu shelters to keep off the fog.

"The cinders still kept falling. They seemed at times to come

down right against the wind. They stung my face and made me restless.

"All night we moved about the hills. Thousands were moving with us. As the night wore on the crowd grew.

"Near daylight the soldiers came to the park. They were still moving in front of the fire.

"I had brought a little store of provisions before nightfall and somehow we had kept them. It seemed easy to keep things there. I walked over to the fire made by one squad of soldiers and picked up a tin bucket. They looked at me but made no move. I went to a faucet and turned it on. Water was there. Not much, but a trickling little stream. There was water in the park all night. I boiled some eggs and we ate our breakfast. Then we concluded to try to make our way back to the water front. We did this because the soldiers were driving us from that part of the hills. The flames were still after us.

"The dumb horror of it seemed to reach right into one's heart. Walking and resting, we reached the ferry near sunset. We had come back through a burned district some four miles. I do not understand how the people stood it.

"Other parties staggered past us. They were reeling, but not from wine. It was here that the pangs of thirst caught us. But the end came at last. We reached the ferry and the boats were running. The soldiers were there, too. They seemed to be everywhere. They were offering milk to the women and children.

"We are in Los Angeles now. It hardly seems real. If it were not for the sting of the cinders that still stick to my face and eyes I might think it was all a nightmare."

Adolphus Busch, the St. Louis brewer, gave this account of his experiences in the earthquake:

"The earthquake which shook 'Frisco made all frantic, and was undoubtedly the severest ever experienced in the United States. The St. Francis hotel swayed from south to north like

a tall poplar in a storm; furniture, even pianos, was overturned, and people thrown from their beds.

"I summoned my family and friends and urged them to escape to Jefferson square, which we did.

"An awful sight met our eyes. Every building was either partly or wholly wrecked, roofs and cornices falling from sky-scrapers on lower houses, crushing and burying the inmates.

"Fires started in all parts of the city, the main water pipes burst and flooded the streets, one earthquake followed another, the people became terrified, but all were wonderfully calm. Over 100,000 persons without shelter were camping on the hills. There was no light, water, nor food. Regular soldiers and the militia maintained order and discipline, otherwise more horrors would have occurred and riots might have prevailed. Then the worst happened. The fire spread over three-fourths of the city and could not be controlled, no water to fight it, no light, and the earth still trembling.

"Building after building was dismantled to check the progress of the flames, but all of no avail. We were fortunate to secure conveyances and fled to Nob Hill, from which we witnessed the indescribable drama. Block after block was devastated. The fires blazed like volcanoes, and all business houses, hotels, theaters—in fact, the entire business portion—lay in ruins, and two-thirds of the residences."

CHAPTER VIII.

THRILLING PERSONAL EXPERIENCES—CONTINUED.

Hairbreadth Escapes from the Hotels Whose Walls Crumbled—Frantic Mothers Seek Children from Whom They Were Torn by the Quake—Reckless Use of Firearms by Cadet Militia—Tales of Heroism and Suffering.

FOR two weeks or more tragedy, romance and comedy crowded the lives of women and children survivors homeless in the city of ashes and in Oakland, across the bay, the city of refuge. In this latter place thousands separated from their loved ones were tearfully awaiting developments, and every hour in the day members of families were restored to each other who had been lost.

On record in the Chamber of Commerce at Oakland, which was the headquarters of the Oakland Relief Committee, some queer stories were told. Not a day passed but there were from two to eight marriages in that office. Homeless young couples met each other, compared notes and finally agreed to marry.

At the registry bureau in Oakland scores of women, young and old, worked gratis. One applied for work to relieve her mind. She said she had seen her husband and eldest son killed and had fled with her baby. During the rush of people she lost her baby.

One of her first duties was to copy names of the lost and found. In one of the lists she believed she recognized the description of her baby. An investigation was made and the child proved to be hers.

A grief-stricken mother came in crying for her child, which she had not seen since the day of the disaster. A member of the relief committee was detailed on the case and he found the baby. The same day, while walking on the street, he saw a woman car-

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FERRY BUILDING.
The clock in tower stopped at 5:15.

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MILITARY QUARTERS.
A view in Golden Gate Park.

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ST. DOMINICI CHURCH.

A part of the steeple shaken out by the earthquake.

CORNER OF A BAPTIST CHURCH.

A view of a Baptist Church on St. Pablo Avenue, Oakland.

rying a baby in a pillow slip thrown over her shoulder. Two hours later he again met the woman. The pillow slip had ripped and the baby had fallen out unknown to the mother. When her attention was called to this fact the mother fainted.

Again the young man set to work and found the baby two blocks away, but upon returning could not find the mother.

One man escaped with his two babes as he saw his wife killed in a falling building. He seized two suit cases and placed a baby in each and started for the ferry. When he reached Oakland he found both smothered. He became violently insane and was put in a strait-jacket.

Hermann Oelrichs of New York, ten times a millionaire and husband of the eldest daughter of the late Senator Fair of California, arrived in Chicago on a scrap of paper on which was written a pass over all railroad lines. The scrap of paper was roughly torn, was two inches square, but upon it in lead pencil were written these magic words:

"Pass Hermann Oelrichs and servant to Chicago upon all lines. This paper to serve in lieu of tickets.—E. H. Harriman."

Mr. Oelrichs described some of his experiences after he was driven from his quarters in the St. Francis Hotel by the earthquake. He said:

"It was heaven and hell combined to produce chaos. I have a bad foot, but I forgot it and walked twenty miles that day, helping all I could. Mayor Schmitz had a meeting in the afternoon at the shaking Hall of Justice and appointed a committee of fifty, of which I was one. He gave me a commission as a member of the Committee of Law and Order, which, together with my policeman's star and club, I shall hand down to my son as heirlooms."

"I am proud of that," said Mr. Oelrichs. "That is the Mayor's own signature and he has proved himself every inch a man. Lots of people thought the Mayor was just a fiddler, but they think differently now.

"The regulars saved San Francisco. The militia got drunk and killed people. The hoodlums south of Market street were all burned out and they swarmed up in the swell quarter. The report was that they meant to fire the houses of the rich which had not been destroyed. Every night a west wind blows from the Pacific, and they meant to start the fire at the west end. That had to be guarded against."

Mr. Oelrichs had fitted up apartments in the St. Francis, packed with curios and rarities to the extent of $20,000. These were all burned.

The operators and officials of the Postal Telegraph Company remained in the main office of the company at the corner of Market and Montgomery streets, opposite the Palace Hotel, until they were ordered out of the building because of the danger from the dynamite explosions in the immediate vicinity. The men proceeded to Oakland, across the bay, and took possession of the office there.

Before the offices of the telegraph companies in hundreds of cities excited crowds of men and women surged back and forth the morning of the catastrophe, all imploring the officials to send a message through for them to the stricken city to bring back some word from dear ones in peril there. It was explained that there was only one wire in operation and that imperative orders had been received that it was to be used solely for company purposes, press dispatches and general news.

Mr. Sternberger of New York was on the fourth floor of the St. Francis, with his wife, son and a maid. After hurriedly dressing he and his family rushed into Union square.

"We had hardly got seated," said Mr. Sternberger, "when firemen came along asking for volunteers to take bodies from the ruins just above the hotel. There was a ready and willing response. It was a low building on which had toppled a lofty one, and all in the former were buried in the debris. We heard the stifled cries and prayers, 'For God's sake, come this way,'

'O, lift this off my back,' 'My God, I'm dying,' and others, nerving us to greater efforts.

"Finally we got to some of them. Bruised, bleeding, blinded by smoke and dust, terrified past reason, the poor fellows who fell in the street fell from utter exhaustion. Those that were penned away below we could not reach, and their seeming far-off cries for mercy and life will ring in my ears till death."

Henry Herz, a New York traveling man, after a terrible experience, made his escape and constituted himself a traveling relief committee. At Sacramento he organized a shipment of eggs. At Reno he set the housewives to baking bread, and in Salt Lake City he had raised a potato fund of $400. Mr. Herz crossed the bay in a launch. The boatman asked him how much money he had, and when he replied, with a mental reservation, $46.60, the boatman charged him $46.60 and collected the money in advance.

Worn by the exposure, hardships, and terrors of a two days' effort to escape from the stricken city, Mrs. D. M. Johnson of Utica, N. Y., and Miss Martha Stibbals of Erie, Pa., passed through Denver.

"The first that we knew of the earthquake was when we were awakened in our room at the Randolph Hotel by a terrific shaking which broke loose fragments of the ceiling," said Miss Stibbals. "There followed a tremendous shock which shook the building sideways and tossed it about with something like a spiral motion. When we reached the street people were running hither and thither.

"Fire was breaking out in hundreds of places over the city and the streets were becoming crowded with hurrying refugees. Where they were unable to procure horses, men and women had harnessed themselves to carriages and were drawing their belongings to places of safety. As we passed through the residence district where wealthy people lived we saw automobiles drawn up and loaded down before houses. Their owners remained un-

til the flames came too near, and then, getting into the machines, made for the hills.

"We saw one man pay $2,000 for an automobile in which to take his family to a place of safety."

"I climbed over bodies, picked my way around flaming debris, and went over almost insurmountable obstacles to get out of San Francisco," said C. C. Kendall, a retired Omaha capitalist, upon his arrival home.

"I arrived in San Francisco the night previous to the earthquake. I was awakened about 5:15 in the morning by being thrown out of my bed in the Palace Annex. I rushed to the window and looked out. The houses were reeling and tumbling like playthings. I hurried on clothing and ran into the street. Here I saw many dead and the debris was piled up along Market street.

"I went to the office of the Palace Hotel and there men, women, and children were rushing about, crazed and frantic in their night clothes. The first shock lasted only twenty-eight seconds, but it seemed to me two hours.

"A few minutes after I reached the Palace Hotel office the second shock came. It was light, compared with the first, but it brought to the ground many of the buildings that the first shock had unsettled.

"Fires were breaking out in every direction. Market street had sunk at least four feet. I started for the ferry. It is only a few blocks from the Palace Annex to the ferry, but it took me from 6 a. m. to 10:15 a. m. to cover the space.

"Men and women fought about the entrance of the ferry like a band of infuriated animals.

"I made my escape—I do not remember how, for I was as desperate as any of them. As the boat pulled over the bay the smoke and flame rose sky high and the roar of falling buildings and the cries of the people rent the air."

J. C. Gill, of Philadelphia, told his experiences as follows:

"Mrs. Gill and myself were in a room on the third floor of the hotel. We were awakened by the rocking of our beds. Then they seemed to be lifted from their legs, suspended in the air, and as suddenly dropped, while the plaster began cracking and falling. We arose and left our room after putting on a few clothes. We felt that with every step we were treading on glass and that the ten stories above us would fall, not allowing us to escape alive. But once outside the building and with our friends I began to realize what had happened.

"I made my way back to the room and carefully packed our suit cases. I came across a valuable necklace and pearls that my wife in her haste had left behind.

"With hundreds of others we roamed in the park in front of the hotel several hours. When we saw the fire was hemming in the lower part of the city we walked toward the outskirts. Early next morning we decided to leave the city, and started to the ferry. Policemen would stop us, and it was with difficulty and much trepidation that we walked through the burned district, and arrived at the wharf at 5:15, just fifteen minutes before the boat left.

"The scenes we passed through were sickening and indescribable. I fancy that scores of men, wharf rats, who had looted wholesale liquor houses and were maudlin drunk, were burned to death without being the wiser, because of their condition."

"I had been stopping at the Metropole in Oakland," said Frederick Lemon of New York, "and Tuesday night went to Frisco, where I stopped at the Terminal hotel, at the foot of Market street. The first shock threw all the loose articles around my room and I attempted to run unclad from the hotel. Just as I walked out the door I was struck by some heavy beams. I was stunned and while I lay there some one from the hotel brought me my clothing."

"At that time the streets were like bedlam. Soldiers were in control, and while the regulars were almost perfect in their at-

tempts to maintain order the militia men lost their heads. They shot some men without provocation, and never thought to cry 'halt' or 'who comes there?' "

Henry Kohn of Chicago told of a horrible experience he had. "I had a room on the fifth floor of the Randolph Hotel, Mason and O'Ferrell streets," he said. "The first quake threw me out of bed. By the time I reached the second floor the building had ceased shaking, and I went back, got my clothes, and went into the street. In the building across the street twelve persons were killed. About 11 o'clock in the morning we were in the public square, with about 1,500 other refugees, when a severe shock was felt. People became panic stricken; some prayed, women fainted, and children shrieked and cried.

"The stream of people going up Nob and Telegraph hills all Wednesday was a pitiful sight. Many were barefooted and lightly clad. There was nothing to eat or drink."

Sol Allenberg, a New York bookmaker, was with Kohn at the St. Francis Hotel. "I was sick in my room when the shock struck us," he said, "and my friend helped me out to a boarding house on the hill. There I had to pay $7 for a room for the rest of the day.

"It was two miles from the fire and I thought I was safe enough when I got into my bed at noon, but about two hours later they awoke me to tell me that the fire was only two blocks away, and we got out only a short time before the house went up in flames.

"No exaggeration of the horrible scenes on the street is possible. There was one poor fellow pinned to earth with a great iron girder across his chest. It in turn was weighted down by a mass of wreckage that could not be moved. He could not be saved from the flames that were sweeping toward him, and begged a policeman to shoot him.

"The officer fired at him and missed him, and then an old man crawled through the debris and cut the arteries in the man's wrists. The crowd hurried on and left him to die alone."

CHAPTER IX.

THROUGH LANES OF MISERY.

A Graphic Pen Picture of San Francisco in Flames and in Ruins—Scenes and Stories of Human Interest where Millionaires and Paupers Mingled in a Common Brotherhood—A Harrowing Trip in an Automobile.

AMONG the most graphic and interesting pen pictures of scenes within and without the stricken city were those of Harry C. Carr, a newspaper photographer and correspondent of Los Angeles. This is his personal narrative:

I started from Los Angeles for the stricken city on that pitiful first train whose passengers were nearly all San Francisco men trying frantically to get back to their wives and children, whose fate they could only imagine.

All one terrible day I walked about through the lanes of the charred ruins that had once been San Francisco. I was one of the hungry who robbed grocery stores for their food; one of the parched thousands who eagerly drank water out of the gutter leakage of the fire engines.

After hours of discouraging failure, of being turned back by the sentries, with the sound of dynamited houses ringing in my ears, I managed at last to join the long caravan of homeless families carrying all the property left to them in the world in sheets.

Sometimes I walked with the daughter of a Van Ness avenue millionaire lugging a bundle over her shoulder, and again with a Chinaman moaning piteously over the loss of his laundry.

I came out of San Francisco on that broken-hearted first train carrying refugees, whose faces streamed with tears as they took

the last look from the Pullman windows at the weirdly beautiful red fringe of fire creeping along the ridges of the distant hills, burning the remnants of San Francisco.

An hour after the first word reached Los Angeles on that fateful Wednesday morning our train pulled out of the depot. There was an ominous number of reservations for Santa Barbara on the chair car. Most of the San Francisco men came on board there.

Beyond San Luis Obispo, two big freight trains were stalled by a cave-in caused by the earthquake. They crawled out just in time—before every one went mad.

At Salinas, about dark, the conductor came back, shaking his head; a freight train ahead at Pajaro had been completely buried by a mountain of earth hurled in the quake.

The men said it was likely to be a week before any train went through.

Three or four of us hurried into the town looking for an automobile. One of the passengers on the train was Mrs. Robert Louis Stevenson, and the news had been kept from her until this delay.

Strange to say, there were a number of automobiles in town, but none were to be had. One man was hurrying through from Los Angeles in his own touring car with his three boys to find his wife, their mother, who was somewhere in the burning city.

We were getting ready to hire saddle horses when the twin lights of an automobile came glaring down the street. There were two New England spinsters aboard. They had been in the Palace Hotel when the clerk telephoned to their rooms to tell them the city was burning and that the hotel was about to be blown up by dynamite by the soldiers of the Engineer Corps.

They hired an auto to San Jose at an outrageous price and paid $75 to be taken from there to Salinas. Had it not been for a bridge which kind Heaven smashed, I guess they would have been going yet. As it was, we persuaded them that the train

was the place for them and managed to hire the automobile back to San Jose. The cost was $20 a seat.

Men came to us and begged like frightened children to be taken; but we dared not risk a breakdown and had to refuse. But never shall I forget the look that was in their eyes.

We started at 10:30 and rode all night. It was bitterly cold and we suffered terribly, not having overcoats. The chauffeur had been using his auto all that morning taking medicines to the demolished insane asylum at Agnews.

His story of the scenes there was horrible. Scores of dead were lying stretched on the lawns and others were walking about hideously wounded. Amid this scene an insane woman was wandering, blithely singing little songs of her own improvision about the earthquake and the killing.

One giant maniac had broken his shackles and rescued one of the guards from the building. He had just one sane moment; long enough to be a hero. Then he fled howling into the hills.

It was just dawn when we got to San Jose. Sentries from the militia and special officers were patrolling the streets. A dead line had been established to keep persons away from wrecked buildings. There were jewelry stores whose fronts had been entirely torn off; these would have been plundered.

All through the city we saw people seated on beds on their front lawns, their houses having tumbled. On the front lawn of the Hotel Vendome was a bonfire about which were gathered twenty or thirty people. Every guest of the house had spent the night there with a blanket apiece.

We were just in time to catch the first train to go through to San Francisco. All along the route through such towns as Palo Alto and Belmont, we saw shattered buildings, warehouses with whole sides neatly cut off as though with a knife. One big warehouse of brick had completely buried a freight train standing on a siding.

During the night we could see the dull red glow that came

from the burning city. Now we could see the huge copper-colored clouds that almost hid the sun. As we came nearer the city we could hear the distant explosions of the dynamite with which the soldiers were wrecking the buildings. They came to us in dull but quick thumps.

The train got no further than Valencia street. As soon as we got off we saw the first stragglers of the great army of the homeless and ruined.

Sentries stopped us before we had gone a block, so a cheerful good-looking young fellow, who had seen first his home and his tailor shop utterly destroyed that morning, offered to be our guide.

He took us past the Hotel Valencia, which was the worst sufferer from the earthquake. The big building had been literally poured out into the street in a stream of splintered wood. No one knows how many people perished in it.

On the corner next the Valencia was a new set of three-story flats, just completed, and most of the flats not yet occupied. As though some one had struck it on top with a giant hammer, the entire building had sunk one story into the ground; you could walk right in at the second story.

Turning down into Steiner street, we were caught in the flood of the strangest tide the world ever saw. There never was anything like this before.

These were people warned to leave their homes from some district newly doomed to the Fire God.

They were treking, in a long, motley procession, to find some park not already crowded to overflowing.

One of the first that I met was a little family beginning life over again. What they had been able to rescue before the flames came was packed in a little express wagon. The elderly husband was drawing this. Behind him came his wife. With the forethought of a woman, she had either bought or stolen two packages of breakfast food—all that stood between them and starva-

tion. They looked drawn and anxious; and were rather peculiar in this regard.

Most of the refugees leaving their homes were cheerful.

I saw a pretty "tailor-made girl" meeting her friend on the street. One of them had a little bundle of things tied in a handkerchief.

"That's everything I own in this world," she said, grinning—positively grinning.

"That's nothing," said the other girl, smiling back, "I haven't a rag to my back or a cent of money, and I've lost track of my family somewhere in this crowd."

"Oh, well, what's the use of worrying?" And with that they parted.

Another touching little group was led by the father, who carried a sheet tied up with what he could carry. The young mother was dragging a child's express wagon laden mostly with provisions. Behind her trooped two sweet little girls. One was wrapped up in a big shawl (this was just after sunrise.) A kitten, which she held in her arms, was poking its nose protestingly out from the shawl. Bringing up the rear was the other little tot, hugging a doll under each arm.

A fine looking young fellow in khaki trousers and a fashionable coat was packing an enormous clothes bundle. His young wife was clinging to his arm. It was everything they had left in the world, probably out of years of hard saving, but they were both almost going along with good spirits.

A little further up the street, I saw a refined looking young girl cooking breakfast in the gutter. She wore a handsomely made but badly torn skirt and had a remarkably fine bracelet on one wrist. Her oven was made of two bricks and a toasting grill. A young man was bringing her bits of fire wood and they were consulting together over the frying of bacon.

Further on were two other women doing the same thing and having fun out of it between themselves.

"Is it so very much farther?" was the only complaint that came from one tired little woman who looked ready to faint. She was staggering under the weight of a huge bundle. She looked unused to work and her lips were white and trembling with exhaustion. She rested just a minute, then staggered on without another word of complaint.

Men spoke kindly to her, but none offered to help her, because Woe was the great leveler and all were on the same footing. All the day I spent in San Francisco, I only heard one person speak unkindly to another. I wish I had that young man's name, just as a curiosity. He had been hired by a woman to drag a big Roman chair filled with treasures up the street.

"There," he said, insolently, "I have earned all the money I got for that; now take it along yourself."

Without a word, the woman took the chair from him and wheeled it on herself.

One rather amusing group was wheeling an immense and very handsome dining-room table. The young man who was pulling from the front was protesting vigorously; but the two young girls who shoved from behind, digging their stubby fashionable little oxford ties in the dirt for foothold, urged him peremptorily on. Following them was a half-grown hobbledehoy boy, strong enough to have packed an ox, who was doing his heavy share by carrying a little glass vase.

In a doorway half way up the hill, I saw an old Chinaman sitting with his bundle, which was all he had been able to save. He was just saying, "Oh, oh, oh," in a curious, half-sobbing moan that never seemed to cease.

The young tailor with me said the Chinaman had lost his laundry and was terror-stricken lest the white people should make him pay for their clothes.

While his own tailor shop was burning, the young tailor said that he was out trying to rescue the trapped victims in the burning Hotel Brunswick.

He could only get hold of one living man. He seemed to be caught in the wreckage, the smoke being too thick to permit one to see just how. Strong hands caught his feet and pulled desperately. When they dragged him out at last, they found that he had been caught under the chin. In pulling him out they cut his throat almost from ear to ear.

As we gained the top of the hill on Steiner street, a San Francisco man who came in with me on the train stopped dead still. "My God; look there!" he said, his voice catching with a sob.

Through the rift of the buildings we caught our first glimpse of the dying city.

"That was Market street," said the San Francisco man, softly.

He pointed across a vast black plain, hundreds of acres in extent, to a row of haggard, gaunt specters that did seem to be in two lines like a street.

"There's the City Hall," he said, tremulously, pointing to a large dome surmounting a pile of ruins and surrounded like some hellish island with vast stretches of smouldering ashes and twisted iron girders.

The San Francisco man found a tottering, blackened pile of wall that he said was Mechanic's Pavilion, and a sort of thin peak of brick that he said was the new Bell Theater. He would go over the town from the top of the hill and torture himeslf trying to locate San Francisco's splendid landmarks in these acres of ash heaps.

Down in the middle of the city I found two young men in a violent argument over the location of Market street in the ashes.

At the pretty little park, Fell and Steiner streets, we came upon one of the strange little cities of refugees. I should pronounce this one of the most select residence districts of San Francisco now. It is the only home of hundreds upon hundreds of once well-to-do San Francisco people now ruined.

It was heart-rending to see the women tidying things up and trying to invent new ideas for attractive homes—trying to make

their homes look better than their neighbors', just as they did before.

Some women made odd little bowers of two blankets and a sheet tent.

I passed one tent where a young mother was lying at ease with her little girl, under a parasol. Just as I was going by, the little girl demanded "another." The mother laughed happily and began, "Well, once upon a time——"

As though one of the stories of all the ages was not going on down the hill below her!

To one of the groups on the lawn came a young man grinning all over and positively swaggering. He was received with shrieks of joy. He had six cans of sardines. He brought them to people who would have been insulted at the idea two days ago.

The San Francisco man invited me into his house, where we saw the wreck of his cut glass and library. But he forgot it all over a rare piece of good forune that had befallen. The maid had managed to get a whole tea kettle of water. It was vile and muddy; but it was water.

The young tailor told me that he had gone from daylight until 11:30, parching for a drink. The saloons were closed by order of Gen. Funston, but he managed to get beer from a saloon man.

In some parts of the city there is plenty of water. But I saw people rushing eagerly with buckets to catch the water out of gutters where it had leaked from a fire hose. In the first terrible water famine, the firemen broke into sewers and threw sewer water on the fires.

The dramatic moments came as one neighborhood after another was told to pack up and move out. It was the sounding of doom. I saw several of these sorrowful dramas.

One was in an old-fashioned street where old southern houses with iron dogs planted about the lawns had been pressed in upon by lodging-houses and corner groceries. It seemed mockery to

think how the people in the aristocratic old houses must have raged at the intrusion of the corner stores. How futile it seemed now!

Came a dapper young cavalry lieutenant into the street. From their porches people watched him with pathetic anxiety. They could see the sentry's heels click together and his carbine snap down to a present. With a few words the officer would hurry on.

Making a megaphone of his hands, the sentry would turn and bawl these words up the otherwise silent street: "This street is going to be dynamited; if you want anything in the grocery store, go to it!"

The balance of his remarks, if there were any, would be lost in a shout of applause from the crowds that seemed to smell such things. A rush for the grocery store would follow.

Men would come out laden to staggering with loot—canned goods, flour, bacon, hams, coffee—as much as they could possibly pack.

I saw one little girl not over four. This was the day she always had been dreaming of. Hugged to her heart was an enormous jar of stick candy, big enough to give her stomach-ache for the rest of her life. She could hardly lift it; but she put it down to rest, then went panting on.

At the warning of the sentry, the whole family in each house would rush back through the front door to rescue whatever treasure lay nearest their hearts. They only had four or five minutes. Men would come dragging bureaus and lounges. Often a man would be pulling along the family pride, the woman shoving from behind.

In one thrilling rescue I had the distinction of participating. An elderly woman grabbed me excitedly by the arms and gasped, "Catch it."

She pointed to a dejected canary perched on a window sill. I shinned gallantly up the side of a dead wall; just touched the

canary bird with the tips of my fingers. It flew and a lady caught it triumphantly like a baseball as it came down. She went away "mothering" it.

Presently, the sentry would shout another warning and the people would scurry away, peeking out from behind safe corners. As if by magic, the streets would be thick with soldiers. The engineers would place the dynamite and they would all hurry out of danger.

Bang! And the grocery store would go scattering into the air.

It must be confessed that the dynamiting did very little good. It seemed to provide fine splintered timber as kindling for fiercer flames which jumped the gap supposed to check them.

The sound of the explosions was to be heard all day long almost like minute guns.

Let a word be interjected here about those splendid boys in blue uniform hurried into the city from the forts about San Francisco. They make one proud of the army. No more superbly policed city ever existed than the burning and stricken San Francisco.

Soldiers seemed to be everywhere. Almost at every street corner with fixed bayonet and ominous cartridge belt. Infantry, cavalry (some mounted infantry) and engineers, all doing sentry duty.

Gen. Funston was in personal command—not from his office, either. He went plowing around the most perilous streets soaked to the skin from the fire engines.

San Francisco in this time of panic and distress was more quiet and orderly than ever before. I saw not a single disturbance of the peace. With it all, the soldiers were polite, and seemed to try in every way to show courtesy and consideration. When they had to order people back, they did it in a quiet and gentlemanly way.

I met men who claimed to have seen men shot down by the

JAMES D. PHELAN.

Former Mayor of San Francisco, and who gave $1,000,000 for the relief of the sufferers. Largest sum given by an individual.

EUGENE E. SCHMITZ.

Mayor of San Francisco and who rendered great assistance in bringing order out of chaos.

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GOVERNOR PARDEE OF CALIFORNIA.

The prompt help in relief work rendered by Gov. Pardee stamps him as one of the greatest humanitarians

MAJOR GENERAL ADOLPHUS W. GREELY.

Commander of the Pacific Division of the U. S. Army in the earthquake district. General Greely is well

soldiers for defying orders for unlicensed looting. Also there is a story of a negro being shot dead by a policeman for robbing a dead body.

One story I would like to believe—that a poor wretch pinned in among the blazing ruins roasting to death begged to be shot and some cavalry trooper had the moral courage to send a bullet through his brain.

Although I walked probably fifteen miles back and forth through the city, I saw very little unlicensed looting. Many grocery stores which did not seem to be in immediate danger, were thrown open; one very oddly. The proprietor nailed up one window with slats about four inches wide. He made the refugees line up, and each was privileged to take all he could reach through the window slats.

Some grocers and tradesmen were not so charitable. In other places I saw them demanding from people in danger of starving, 75 cents a loaf for bread.

Bread was the scarcest article except water.

The last of the tragedy that I witnessed was not only the most dramatic but the most tremendous.

It should be called the "Exodus," for it was a Biblical scene. It was the headlong flight of those who were most terror-stricken to get out of the doomed city.

All day long a procession of almost countless thousands was to be seen hurrying with all the possessions they could carry. There were people with bundles, packs, laden express wagons, hacks bulging with plunder, brewery wagons pressed into service, automobiles, push carts, even fire hose wagons.

I happened along at a crucial moment. One of the lieutenants whose peculiar and melancholy function seemed to be to pronounce the doom of one section after another, had just sent warning to Nob Hill, the center of fashion in San Francisco.

For hours I had been working my way toward the Oakland ferries. As a last hope, some one told me I might get there by

going over these hills and following the line of the water front.

I got there after the warning had been given. It was San Francisco's wealthiest and most exclusive society who had to pack and sling their bundles over their shoulders.

And they did it with just as good grace and courage as the others. All were making a frantic attempt to hire expressmen with any kind of vehicle that would move, and most of them were failing.

During the first of the fire, some young society women with very poor taste, went autoing around the stricken districts as though it were a circus. They were stopped by a sentry and were made to get out of their car and hand it over to a posse of special officers being hurried to some district in new peril.

As I gained the top of Nob Hill and turned to look back, it was clear why the warning had been given. In one direction, hospitals were burning south of Market street.

In the center distance the big car barns were on fire and roaring with flames. Ordinarily this would have been a sensation of a week. Now it wasn't even considered worth while to send fire engines and nobody stopped to look as they walked by.

The main streets, where the business part of the city had been, were black with an immense throng of people who were walking up and down among the ruins.

Looking toward the ferries, I could count nine big skyscrapers, all crowned with fire, outlined in a lurid row against the sky line. The flames were creeping slowly, but with deadly persistence, toward Nob Hill, with several lesser fires blazing in between.

It was high time Nob Hill was moving.

One old man had chartered an express wagon, and was on top of the wagon frantically interfering with the work of removing the goods from a big, aristocratic-looking house.

"The books!" he shrieked, "Why in heaven's sake don't you bring the books?"

A swagger young woman came to the door with a handsome mantel clock and walked calmly down the stairs. "Please put this in some especially safe place, please," she said, as composedly as though this were nothing more than any ordinary moving day.

Down the street I saw a woman with the bearing of a patrician shoving at the rear of a push cart, loaded with all of the few things she could save; a servant was drawing it.

Behind came a young girl, who half turned for a last look at the house, and burst out crying. Her mother left the load for a moment and comforted her. "Never mind, dear," she said. "Don't cry! See, mamma isn't crying."

"Mamma" knew that in a few minutes her home and all the property she had in the world would die in the fire just as her husband's business had already done; but mamma wasn't crying.

On the corner of Van Ness avenue and Broadway, I saw a girl well dressed, who had evidently been driven out from there. All she had saved was a bed tick filled with something. As it was very hot, and she was very tired, she had spread it on the pavement, and was watching the throng from under her parasol.

I saw another girl in a trig outing suit and little patent-leather shoes, toss a bundle, done up in a sheet, over her shoulder and walk away in the procession with the most fascinating nonchalance.

One woman I saw going away in an elegantly-fitted private carriage. It was drawn by two horses with tails about two inches long and soaring; so she must have been near the top of the Upper Crust.

She, too, joined in the flight. Just as she got to the bottom of the hill she had the driver stop. I saw her turn and take a last wistful look from her carriage window at her doomed home. She was not attempting to take anything with her. Like many others, she had simply locked her door and gone.

Many of these people, rich one day, are practically paupers on

the morrow. Many of them slept outdoors in the parks under a blanket, afraid to sleep in their own palatial homes.

What I call the "Exodus" fled down Van Ness avenue to the water front, thence along the Barbary Coast and tough water front by an enormously long detour to the ferries; it was the only way, the town streets being on fire and closed by the military.

The farther you went along the more conglomerate the throng became. The inhabitants of the foreign quarters began pouring out to join the flight.

I was so tired with a long day spent walking about the burning city that it seemed an impossibility that I should keep on. Every step was actual physical pain.

Twenty passing cabs, returning from the ferries, I stopped and tried to charter. The drivers, after bigger game, would wave me aside and say "Nothin' doin'."

One cabby said that he had to hurry out to the other end of the city to rescue his own family who were in danger. Another young autocrat on the cabby's box took a long puff on his cigarette before he replied to my appeal.

"Fellow, you couldn't hire this hack for a million dollars," he said.

There was one amusing feature in the terrible procession. She was a haughty dame from Van Ness avenue. All that she could save she had stuffed into a big striped bed tick. She was trying to drag this along, and at the same time trying to maintain the dignity of a perfect lady. Candidly, it was not a success. One can stick pretty nearly everything into a striped bed quilt, but not dignity.

All along the way were women who had dropped out from exhaustion and were sitting there with their bundles in utter despair.

CHAPTER X.

WHOLE NATION RESPONDS WITH AID.

Government Appropriates Millions and Chicago Leads All Other Cities with a Round Million of Dollars—People in All Ranks of Life from President Roosevelt to the Humblest Wage Earner Give Promptly and Freely.

THE fiery destruction of the beautiful city and the pitiable plight of the survivors who escaped annihilation from quake and fire only to face death in the equally horrible forms of starvation and exposure touched the heartstrings of humanity. The response to the needs of the stricken city and its people was so prompt, so universal and so generous that forever it will appeal to the admiration of mankind. It was a response that did not wait to be asked but in the moment when the need became known voluntarily turned the tide of the abundance of the unstricken to the help of the unfortunate before they had even breath to voice their need.

All over our own land, from every state and city and hamlet, from the president and the assembled congress, dropping all else to turn the nation's resources generously to the rescue, through all grades of the people the response broke forth spontaneously, generously, warmly, without stint and with such practical promptness that relief for unexampled distress was already on the way before the close of the first fateful day.

From all the seeming sordidness of daily life one turns to this as proof incontestable that humanity is at heart infinitely kinder and better and less selfish than it esteems itself. Even other lands and other peoples when the horror of the calamity became known to them, added to the stream of gold, which had its beginning

in the sympathetic hearts of the American people and its ending in the stricken and despairing city. Once more were the lines of the geographer and politician obliterated and there was in the lurid light of the awful hours no north, no south, no east, no west. Once more did those in charge of the coffers of the municipalities raise high the lid and contribute to relieve the woe.

And Chicago, as became the Queen City of the Lakes, and which once in an almost equally dire calamity was, herself, the recipient of generous aid, was among the very first which recognized the need of prompt and generous aid. Almost as soon as the news of the direful plight of the city by the Golden Gate had been flashed over the wires, the Merchants' Association of Chicago telegraphed to the authorities of San Francisco that it would be responsible for a relief fund of $1,000,000, and that any portion of that sum could be drawn upon at once. Then Mayor Dunne issued a call for a special relief meeting at which a big committee of the leading men of the city was formed and immediately went to work. Fraternal organizations, the newspapers and the clubs became also active solicitors for aid.

For several days the streets of the city presented a peculiar appearance. Upon the street corners stood boxes showing that funds deposited within would reach the homeless of the Pacific coast. Smaller boxes stood in the hotels that the strangers in the city might have an opportunity to contribute. Within the large stores in the business center were other boxes that the shoppers might have an opportunity of displaying their sympathy in something more tangible than words. Upon other corners stood the men and women of the Volunteers of America and the inscriptions above their boxes told that all pennies, nickels and dimes would eventually find their way to the stricken of San Francisco.

But while Chicago was the first of distant cities to pledge a big contribution, other cities throughout the country were not far behind. In Faneuil Hall, Boston, a meeting which over-

crowded that historic temple of liberty was held, and Bishop Mallalieu of the Methodist church, at the close of an eloquent address, had a motion enthusiastically passed that the state of Massachusetts raise $3,000,000 for the relief of the earthquake and fire victims of the Pacific coast. In the meantime the city of Boston had already pledged $500,000 of that amount.

The city of Philadelphia at a formal meeting of its council voted $100,000, while the relief committee of the people there had secured $125,000 for the sufferers of the stricken city.

And the congress of the United States, as became it, was prompt in action. In the lower house a bill appropriating $1,000,000 was introduced and passed at once, and a few days later a similar measure of relief was adopted, making the contribution of the government $2,000,000 altogether. This was about one-third as much as was required to care for the thousands who were made homeless by the Chicago disaster of 1871. President Roosevelt also sent a message to congress urging a further contribution of $500,000, and in an address to the public urged that they send contributions to the National Red Cross society as the readiest means by which the afflicted could be reached. Governor Deneen of Illinois also issued a proclamation to the like effect. Secretary of War Taft, in his capacity of President of the American National Red Cross society, issued a proclamation in which he announced that the necessary work of organization to feed and shelter the people was placed in the hands of the Red Cross society, under the direction of General Funston, Commander of the Department of the Pacific. In this way matters were made systematic and authorative and assurances given that the contributions of the nation would be honestly and economically distributed to those in need. Among other states and cities not already mentioned, whose contributions were generous enough to deserve permanent record, were the following—and the amounts named may be in most cases set down as somewhat below the real final figures:

Texas	$100,000	Jacksonville, Fla.	10,000
Connecticut	30,00	Los Angeles	200,000
St. Louis, Mo.	100,000	Cincinnati	75,000
Sacramento	100,000	Omaha	10,000
Seattle, Wash.	90,000	Providence, R. I.	20,000
Victoria, B. C.	25,000	Davenport, Iowa	20,000
Spokane, Wash.	30,000	Stockton, Cal.	20,000
Milwaukee	30,000	Portland, Ore.	130,000
City of Mexico	30,000	Sacramento, Cal.	100,000
Des Moines	10,000	Columbus, O.	20,000

Among individuals in this and other countries who promptly sent in their contributions were the following:

Russell Sage	$ 5,000
London Americans	12,500
Clarence H. Mackay	100,000
Mrs. John W. Mackay	5,000
Robert Lebaudy	10,000
W. W. Astor	100,000
President Roosevelt	1,000
Senator Knox	500
C. J. Burrage, Boston oil dealer	100,000
President Diaz, Mexico	100,000
E. H. Harriman (for his railroads)	200,000
Andrew Carnegie	100,000
Charles Sweeney, New York	10,000
W. K. Vanderbilt	25,000
"Friend of Humanity," New York	25,000
H. C. Frick	10,000
Gordon Blanding	10,000
H. M. Bowers, Boston	10,000
Robert Schandy, France	10,000

Among the corporations and organizations which lost no time in going to the rescue of the afflicted and helpless were the following:

Bank of Commerce, Toronto	$ 25,000
Columbus Board of Trade	20,000
National Carpenters' union	10,000
United States Steel Corporation	100,000
Kuhn, Loeb & Co., New York	25,000
United Mineworkers of America	1,000
Standard Oil Company	100,000
North German Lloyd Steamship Company	25,000
Wisconsin Masons	5,000
Carnegie Hero Fund	25,000
Heidelback-Ickleheimer, New York	10,000
National Park bank, New York	5,000
New York Stock Exchange	250,000
Citizens' Relief Association, Philadelphia	100,000
Detroit Board of Commerce	10,000
N. K. Fairbank Co	1,000
National Biscuit Co	5,000
Hamburg-American Steamship Line	25,000
Canadian Parliament	100,000

CHAPTER XI.

ALL CO-OPERATE IN RELIEF WORK.

Citizens' Committee Takes Charge of the Distribution of Supplies, Aided by the Red Cross Society and the Army—Nearly Three-Fourths of the Entire Population Fed and Sheltered in Refuge Camps.

PRESIDENT ROOSEVELT inaugurated the organized and systematic relief work through the National Red Cross Society. Before the embers of the conflagration had cooled he issued the following statement:

Washington, D. C., April 22.—The following statement was issued from the White House this afternoon:

"To the public: After full consultation with Secretary Taft, the president of the American National Red Cross Association, who also as secretary of war is controlling the army work and the expenditure of the money, probably two millions and a half, appropriated and to be appropriated by congress for the relief of San Francisco, I wish to make the following suggestion:

"Contributions both in money and in kind are being given most generously for the relief of those who have suffered through this appalling calamity. Unless there is a proper organization for handling these contributions they will in large part be wasted and will in large part fail to reach the people to whom it is most to be desired they should reach.

"The American National Red Cross Association has sent out to take charge of the relief work Dr. Edward Devine, general secretary of the Charity Organization Society of New York, whose experience has been large in work of this kind. Dr. Devine will work in conjunction with Judge Morrow, United States

Circuit judge of the Ninth circuit, and the head of the California Red Cross Association. Gen. Funston already has been directed to co-operate with Dr. Devine, and has advised the secretary of war that he will do so.

"Secretary Metcalf, who is on his way to the Pacific slope, will at once put himself in touch with Dr. Devine, as well as with the judge, the governor of California, and the mayor of San Francisco, to see if there is anything else the administration can do, and he will assist in all possible ways the effort to systematize what is being done.

"I recommend that all charitable and relief organizations and individuals who desire to contribute do so through the Red Cross Association, and that where provisions and supplies be sent they be consigned to Dr. Devine, Red Cross, San Francisco, and that Dr. Devine be notified by telegraph of the consignments. At the same time Jacob H. Schiff, the treasurer of the New York Red Cross Association, in New York, may be notified that the consignments have been sent to Dr. Devine, or else the notification can be sent to Charles H. Keep, assistant secretary of the treasury, Washington, D. C., and treasurer of the American National Red Cross Association.

"I also suggest that all contributions that already have been forwarded be brought to the attention of Dr. Devine by telegraph, which telegram should state the name and address of the consignee and the amount and nature of the consignment. It is better to send all moneys to Mr. Keep or Mr. Schiff; they will then be telegraphed to Dr. Devine as the money is needed.

"The White House, April 22, 1906. Theodore Roosevelt."

At the time the foregoing was issued the President was not aware that the Citizens' Committee of San Francisco headed by ex-Mayor James D. Phelan was completely organized for relief work and was at the time directing the succor of the victims.

Upon learning this fact he speedily endorsed the committee

and its work, and instructed the Red Cross Society to co-operate with the Citizens' Committee.

President Roosevelt aroused criticism in some directions by declining aid from foreign countries. The first tenders of aid from abroad came from foreign steamship companies and later several foreign governments expressed a desire to contribute. The President took the ground that the United States was able to provide all the relief necessary. The justification for his attitude was expressed in an address by General Stewart L. Woodford, former minister to Spain, speaking with the authority of the President. He said:

"The President, in the midst of the horrors of San Francisco kindly but firmly declined the assistance offered by the other nations, and especially, through St. George's society, the assistance of England. The President meant simply that, bowed as the American people were under their load, it was his wish that the American people show to the world that under such an adversity the United States would take care of its own; would rise equal to the terrible occasion; would feed their own hungry, would clothe their own naked, and, spurred on by the indomitable courage which this people always have exhibited under stress of distracting calamity, set up their flag and move to the assistance of 'the city that once was,' and build a new city, even though the earth shook beneath its foundations.

"In doing this—in refusing your great beneficence, the President still feels that he is greatly honored, as the American people are, in that England and the other great nations not only sent messages of regret, but offers of substantial material aid. He felt that the nation, as a nation, would set an example to other nations."

All funds and supplies were dispensed through the Citizens' Committee or general relief committee as it was known, with the co-operation of the army and the Red Cross. Money, food, shelter and clothing poured in from every quarter. On the

Monday succeeding the fire the food problem had been solved and its distribution reduced to a system. The people were fed thereafter in a thoroughly businesslike manner. From the water front, where the boatloads of provisions docked, there was an endless procession of carts and drays carrying food to the scores of sub-stations established throughout the city and the parks. At these stations food and drink, comprising bread, prepared meats, and canned goods, milk, and a limited amount of hot coffee, was served to all those who applied. About 1,500 tons of provisions were being moved daily from the water front.

The food supply committee had fifty-two food depots in operation. Plain food of every description was plentiful.

The troops who dispensed the food played no favorites. Sometimes it took two or three hours to get through the lines, and with three meals a day a man living in the parks passed a good part of his time standing for his food.

The Red Cross saw that weak women and children were provided for without waiting in line. Even the people living in houses had to take their chances with the rest of the crowd in the parks near by.

Fully 30,000 refugees were fed by the government at the Presidio and North beach. Provisions were bountifully supplied to all who made application, and there was no suffering from hunger. Over 10,000 tents were given and the authorities distributed them as long as the supply lasted.

Barracks were erected in Golden Gate Park to accommodate 15,000 persons. The buildings contained thirty rooms, in two room apartments, with kitchen arranged so as to suit a family or be divided for the use of single men.

By great luck a lot of lumber yards along the water front escaped. Their stock was appropriated and used for barracks. Two or three lumber schooners arriving from the northern forest country were seized and the stocks used for the same purpose.

Further, the Red Cross, with the approval of Funston,

went through the standing residence district and made every householder give over his spare room to refugees. Here, generosity was its own reward. Those residents of the western addition who took in burned out friends or chance acquaintances on the first day had a chance to pick their company. Those who were selfish about it had to take whomsoever the Red Cross sent, even Chinese and new arrivals from Hungary.

The Red Cross people enjoyed the grim joke of this. They trotted ten refugees up to the door of a Pacific Heights residence. The woman of the house came to the door. The sergeant in charge made brief explanation.

"Heavens," she said, looking them over. "You have brought me two of my discharged cooks."

"See that the guests are quartered in the parlor," said the sergeant briefly to his high private.

What with tents, barracks, the exodus to other parts of California, the plan of concentration in the standing houses of the western addition, there was shelter for everyone.

The water supply improved every day. Nearly everywhere the order to boil drinking water was enforced.

All vacant houses in the unburned district were seized. Many vacant flats were taken where the homeless are housed and the sick found good accommodations. Churches, and other buildings, including schoolhouses, were turned into living rooms for the homeless.

In some of the provisional camps established for refugees near the foot of Van Ness avenue and near Fort Mason it was difficult to distinguish men from women. The supply of women's clothing had been exhausted, and many women could be seen dressed in ordinary soft shirts and overalls. In that garb they walked about their tents unconcernedly.

It was no time for false modesty and those who were able to make themselves comfortable in any sort of clothing were indeed fortunate.

Within a week conditions had improved so rapidly that there was enough water in the mains to justify the removal of the restrictions on washing. Up to that time the only way to get a bath was to dip into the bay. Lights, only candles, of course, were allowed up to 10 p. m.

An idea of the Titanic task of feeding the refugees may be gained from the figures of the number of hungry people fed in one day. Throughout the city rations for 349,440 persons were distributed. At one point provisions were given out to 672 people in an hour for ten hours.

Two thousand persons were fed daily at St. Mary's cathedral on Van Ness avenue, a relief station organized by the Rev. Father Hannigan and headed by him as chairman of the committee. This was perhaps the best organized and most systematically conducted private station in the city. The committee has a completed directory of the fifty square blocks in the district, and so perfect was the system that there is no duplicating and wrangling. Nine substations gave out orders, and it was arranged for those stations to give out food also. Fourteen members of the clergy were in charge of the various branches of the work.

The emergency hospitals were well organized under direction of army medical officers, and there were plenty of doctors and nurses after the second day.

The only complaint that really existed at that time was the lack of bedding. Though the army and navy were called upon for blankets, quilts, and the like, the supply furnished by those departments was not enough to relieve immediate needs.

Only 30 patients were quartered in the territory that comprised the park emergency hospital at the end of the first week. Considering that over 500 injured people received attention at the park during that time the record was remarkable.

More than 100 physicians and attendants were serving in the park within forty-eight hours after the first shock.

Among the many pathetic scenes connected with the work of relief were others that illustrated the saving sense of humor which keeps people from going insane in times of great calamity and mental stress.

In the vestibule of a church they were giving away clothes. One shivering woman was being fitted out. "Here, dear," said the woman in charge, "here is a nice, good warm waist." "Oh, I couldn't wear it," she answered. "You know, I'm in mourning."

Another girl near by said: "Yes, please, I want a waist. I want pink and white, you know; they're my favorite colors."

Quite suddenly the smile died on our lips. A little mother came up. "I want clothes for my baby; it's cold," she said.

They took the baby from her, and a man near by said to another: "The child is dead."

We went down to Broadway to look for friends. Some people were so dazed they would make no effort to reach the homes of their friends. On the corner was a dapper youth whom we have long known.

A helpful feature of the relief work was the establishment by the Southern Pacific company of a chain of information kept by bureaus, which was served by relays of pony riders carrying the latest bulletins and instructions relative to transportation facilities, provided to relieve the congestion in San Francisco.

A committee sent by the Japanese consul, representing the Japanese relief society, cared for many of the stricken Japanese who still remain in the city. They rendered assistance to white people wherever required. They wired to every large city on the coast asking for supplies to be sent by the Japanese.

It was the desire of President Roosevelt that the work of the Red Cross in alleviating the distress in San Francisco should be done wholly without regard to the person and just as much for the Chinese as for any others.

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REFUGEES ON TELEGRAPH HILL.

These people sought a safe place and are watching their houses and the city burning. Many of them carried bedding, pictures, relics, etc., with them—all they could carry and get to a safe place with their lives.

GENERAL FUNSTON AND WIFE.

CHAPTER XII.

OUR BOYS IN BLUE PROVE HEROISM.

United States Troops at the Presidio and Fort Mason Under Command of General Funston Bring Order Out of Chaos and Save City from Pestilence—San Francisco Said "Thank God for the Boys in Blue"—Stricken City Patrolled by Soldiers.

"THANK GOD for the Boys in Blue!" was the ardent and praiseful exclamation of the people of San Francisco during and after the terrible days that rent by shock and consumed by fire their beautiful city. And as their courage and devotion to save and protect, and their tenderness towards the dying and the dead became known the entire country re-echoed the tribute. For it was the soldiers of Uncle Sam, untiring and unafraid amidst horrors and dangers seen and unseen, that stood between half-crazed refugees from the quake and the fire and downright starvation and anarchy.

When the catastrophe occurred Major General A. W. Greely, in command of the military department of the Pacific, was on his way east to attend the marriage of his daughter, and so the command of the troops and of the department devolved on Brigadier General Frederick Funston; and as on previous occasions when pluck and wise decision were required he showed himself equal to the emergency. The first thing that was done was to divide that portion of the city where order and protection were most needed into six districts, four of them being guarded by the military, one by the marine and one by the navy. Other portions of the city were patrolled by the National Guard and by the city's police force. Because of these arrangements there was thereafter but

little trouble, and practically no more looting. During the fire General Funston established his headquarters at Fort Mason on the cliffs of Black Point, and at once it became the busiest and most picturesque spot in San Francisco. There was an awe-inspiring dignity about the place, with its many guards, military ensemble and the businesslike movements of officers and men. Few were allowed to enter within its gates, and the missions of those who did find their way within were disposed of with that accuracy and dispatch peculiar to government headquarters. Scores of automobiles rushed in and out of the gate, and each car contained an armed guardsman in the front seat furiously blowing a sentry whistle to clear the roadway. At the sound of that tremolo the crowds scattered as if by magic. San Francisco was virtually under martial law, and order was wrought from chaos.

After the quake the President and Secretary Taft were chiefly concerned at first with getting supplies, and that work was performed with extraordinary expedition and thoroughness. At the same time they were rushing troops, marines, and sailors to guard the devastated city.

The marvelous work done by the soldiers, from General Funston down to the newest recruit, won the admiration and congratulations of the entire country. The sentiment everywhere was and is that the army has demonstrated its splendid capacity not only to preserve peace in the face of armed resistance, but to take charge of affairs in a stricken city at a time when intelligent discipline was more needed than everything else.

Secretary Taft expressed the belief that congress would have to give him absolution for the violence he had done the constitution in those terrible days. He ordered General Funston to take complete command of the city, to put martial law into effect, and to enforce sanitary regulations without regard to the wishes of the people.

The war department had been morally responsible for the unhesitating way in which the troops shot down looters and

the people who refused to understand that great situations must be controlled without regard to law.

It was the soldiers apparently who brought order out of chaos. They headed the unfortunate refugees farther and farther on ahead of the flames, until finally they had located the vast homeless mob in the Presidio, in the Golden Gate Park, and in other wide expanses. General Funston had not exceeded his orders. He was given full discretion to employ his forces as he saw fit. He turned loose the soldiers under him with general instructions to act as their own good sense dictated, and it is to the eternal credit of the noncommissioned officers and the privates that every report sent to the war department and all the descriptions in the press reports indicated that the army had saved the situation in San Francisco.

When a sturdy sergeant brought down the butt of his musket on the counter of a bake shop where they were beginning to sell bread at 75 cents a loaf, and announced that bread thereafter in that concern would be sold at 10 cents a loaf or there would be one less baker in the world, he was guilty of an act which in any other time might have landed him in prison.

If he is punished for it now, it will only be after the Secretary of War and the President are impeached, because he was only obeying the spirit if not the letter of their instructions to General Funston.

Soldiers guarded the water wagons, which were driven about the streets, and this show of force was necessary, so that the scanty supplies might be distributed with even-handed justice. In the same way, when General Funston issued orders as the result of which the soldiers compelled citizens to dig graves for the temporary interment of the dead, he violated the law most flagrantly, but he acted as the emergency demanded, and the incident contributed with other things to make the army organization of the United States a little bit the most popular thing in the country in these days.

When the army was reduced at the close of the Philippine insurrection, the machinery was left intact. In this way, although the quartermasters' stores in San Francisco were wiped out of existence, it was possible to hurry supplies to San Francisco. They began arriving there promptly and the danger of famine was averted.

It is the purpose of the war department to continue practical martial law in San Francisco.

It is believed the greatest work of the soldiers, in which term of course are to be included the marines and sailors as well, was in the prevention of pestilence. Practically all of the house to house sewage system of San Francisco had been destroyed. An army of two or three hundred thousand men encamped in the suburbs of a great city would ordinarily die like flies unless it provided itself with proper facilities for the removal of garbage and the general sanitary cleansing of the immense camp. Even with trained soldiers under strict discipline it was an extremely difficult thing to enforce sanitary regulations.

Immense supplies of medical necessities already had been forwarded from the bureau at St. Louis, and General Funston organized at once a series of camps on military lines. The refugees were compelled to live up to sanitary rules whether they liked it or not. Those who refused felt the pick of a bayonet.

Furthermore, out of the tens of thousands of homeless people the soldiers forced as many as were needed to go to work for the common good, putting up shelters, erecting tents, devising storehouses, and, above all, creating the necessary sanitary appliances and safeguards to prevent the outbreak of pestilence.

It required the utmost vigilance on the part of the army officers and the most constant attention by the medical corps to prevent an outbreak of typhoid, dysentery, and the ordinary train of nearly fatal diseases which are common to large military camps, and which are almost inevitable when dealing with an unorganized and unintelligent mob.

Efforts were made to compel every man, woman, and child to obey constantly the strict sanitary regulations which the army provides for its own protection.

Every medical officer and every man in the hospital corps within a wide range of San Francisco had been ordered to report at once for duty under General Funston. With the flames practically under control and with millions of army rations on the grounds or actually in sight of the people, the efforts of the War Department became directed to the preservation of health and in a secondary degree to the location and registration of the dead, the wounded, and the saved.

Following close upon the heels of the rations and the tents there came tons upon tons of disinfectants unloaded at Oakland and every possible device was being employed by the medical bureau to make as good a record in this regard as the quartermaster and commissary departments had already produced in supplying food and shelter.

Meanwhile the ever-ready American private soldier and his splendid executive officer, the American noncom., were really the rulers at San Francisco. They defied the law every minute, but evidently they acted with characteristic good sense. The price of bread was kept down, the mob was being systematized and taught to respect authority, and enough thieves had summarily been shot in San Francisco to render looting a dangerous and an unprofitable avocation.

People who went through the great fire at Chicago in 1871 remember that when Gen. Sheridan brought in regular soldiers he established order within a brief period of time, and there was a feeling of relief when men under his command began to blow up houses in the vicinity of Wabash avenue and Congress street.

The laws of the United States had been violated every minute. Supplies were purchased in the open market, government property had been handed out without receipts to anybody who seemed to have authority to receive it, and the distribution of sup-

plies had been wholly free from the slightest suspicion of red tape.

In spite of these facts, the President and Secretary Taft felt proud of the fact that the army organization had proved itself able to withstand the sudden strain put upon it, while the enlisted man showed his ability to act at a distance from his commissioned officer with an intelligence and an initiative which would be impossible in the European armies.

As during the days of disaster and terror stricken San Francisco was absolutely under the control of General Funston, a few facts about his career will be appropriate here. Red-headed, red-blooded; a pygmy in stature, a giant in experience; true son of Romany in peace and of Erin in war—the capture of Aguinaldo in the wilds of North Luzon and his control of affairs in San Francisco fairly top off the adventurous career of Frederick Funston, fighter.

General Funston was born in Ohio, but when he was two years old his family moved to Kansas. After passing through the high school he entered the University of Kansas. His father had been a congressman for a number of years. His ambition was to enter West Point, but he failed to pass its examination. He later broke into the newspaper business, but his career in that field was short. In 1900 his father secured him an appointment as botanist in the Department of Agriculture. After a trip to Montana and the Dakotas he was attached to the party which made the first Government survey of Death Valley, the famous California death-trap. Seven months were spent in this work, and Funston is the only man of the party alive and sane today.

In 1891-92 the Government sent him to make a botanical survey of certain parts of the Alaskan coast, and in 1893 he returned to the Arctic and made a similar survey of the Yukon. He negotiated Chilkoot Pass, then an untrodden pathway. After trying to start a coffee plantation in Central America and to fill a job with the Santa Fe railroad, the torch of the Cuban revolution became a beacon to his adventurous spirit. He joined a filibuster-

ing party which the Dauntless landed at Camaguay in August, 1896. He was assigned by Garcia to the artillery arm of the insurgent service.

Twenty- three battles in Cuba was his record with his guns. Once he was captured and sentenced to death, but escaped. Later still a steel-tipped Mauser bullet pierced his lungs. This healed, but the fever struck him down, and compelled his return to the United States. As he was preparing to return to Cuba the Maine was blown up and in his certainty that war with Spain would result he awaited the issue. Governor Leedy, of Kansas, telegraphed for him, and he became Colonel of the Twentieth Kansas. He went with General Miles to Cuba in June, 1898, and sailed with his regiment for Manila in October. Three weeks before he sailed Colonel Funston met Miss Ella Blankhart of Oakland. As impetuous in love as in war he wooed and won her, the marriage taking place the day before the transport sailed.

Of his daring risks and feats in the Philippines and of his capture of Aguinaldo the general public is so familiar as not to need recapitulation here. Of his qualities as a fighting man pure and simple, there can be no two opinions. Says General Harrison G. Otis: "Funston is the greatest daredevil in the army, and would rather fight than eat. I never saw a man who enjoyed fighting so much." Another friend of his once said that Funston was a sixteenth-century hero, born four hundred years or so too late, who had ever since been seeking to remedy the chronological error of his birth.

CHAPTER XIII.

IN THE REFUGE CAMPS.

Scenes of Destitution in the Parks Where the Homeless Were Gathered—Rich and Poor Share Food and Bed Alike—All Distinctions of Wealth and Social Position Wiped Out by the Great Calamity.

NEXT to viewing the many square miles of ruins that once made San Francisco a city, no better realization of the ruin can be gained than from the refugee camps located in the districts which were untouched by the flames. Golden Gate park was the mecca of the destitute. This immense playground of the municipality was converted into a vast mushroom city that bore striking resemblance to the fleeting towns located on the border of a government reservation about to be opened to public settlement.

The common destitution and suffering wiped out all social, financial and racial distinctions. The man who before the fire had been a prosperous merchant occupied with his family a little plot of ground that adjoined the open-air home of a laborer. The white man of California forgot his antipathy to the Asiatic race and maintained friendly relations with his new Chinese and Japanese neighbors.

The society belle of the night before the fire, a butterfly of fashion at the grand opera performance, assisted some factory girl in the preparation of humble daily meals. Money had little value. The family who had foresight to lay in the largest stock of foodstuffs on the first day of the disaster was rated highest in the scale of wealth.

A few of the families who could secure willing expressmen possessed cooking stoves, but over 95 per cent of the refugees had to do their cooking on little camp fires made of brick or stone.

Kitchen utensils that a week before would have been regarded with contempt were articles of high value.

Many of the homeless people were in possession of comfortable clothing and bed covering. The grass was their bed and their daily clothing their only protection against the penetrating fog of the ocean or the chilling dew of the morning. Fresh meat disappeared the first day of the catastrophe and canned foods and breadstuffs were the only victuals in evidence.

Not alone were the parks the places of refuge. Every large vacant lot in the safe zone was preempted and even the cemeteries were crowded.

A well-known young lady of social position when asked where she had spent the night replied: "On a grave."

Throughout the entire western portion of the peninsular county of San Francisco these camps were located.

Major McKeever of the United States Army was appointed commandant of the camps and, with his staff of assistants, brought system and order out of the chaotic situation. His first thought was to supply food and water and then to arrange sanitary measures. The throngs of people who crowded elbow to elbow in the open lots and fields without conveniences that are naturally demanded were constantly threatened with an epidemic of disease.

Good order and fellowship prevailed in these impromptu settlements and the common ruin and poverty made all of the unfortunates akin.

In buildings close to the camps the police stored available foodstuffs and bed clothing for convenient delivery. No distinctions were drawn and but few favors shown in the distribution of supplies.

Although efforts of the various relief committees were bent to appease the gnawing hunger of the destitute thousands—efforts that were in a large measure entirely successful—there were many persons without sufficient food or entirely without it.

The government officials took charge of every grocery store in that part of the city still standing and gave out foodstuffs to all those who were hungry. Broad lines were established at Fillmore and Turk streets, at Golden Gate park and at the Presidio and every person who stood in line was given a whole loaf. The line at Fillmore and Turk streets was four blocks long all one afternoon and those at the parks were even longer. A large supply of milk was received from Oakland in the morning and this was distributed to women and children whenever they were found in need. A great deal of this milk was used for the exhausted women.

The breadlines at the parks furnished striking instances of the absolute patience and fortitude that has marked the behavior of the people throughout their trying experience. There were no disorders when the hungry thousands were told to form a line and receive their bread and canned goods. All were content to wait their turn. Silk-hatted men followed good naturedly behind Chinese and took their loaves from the same hand.

Soup kitchens were established in the streets of the unburned section, no fires whatever being allowed indoors, and many hungry persons were fed by these individual efforts.

At the ferry station there were some pathetic scenes among the hungry people. When the boat came in from Stockton with tons of supplies a number of small children were the first to spy a large box of sandwiches with cries of delight. They made a rush for the food, seized as much as they could hold and rushed to their mothers with shouts of "Oh, mamma, mamma, look at the sandwiches!"

Seated around the ferry buildings sat hundreds of people sucking canned fruits from the tins. Some were drinking condensed cream and some were lucky enough to have sardines or cheese. At several places along Market street scores of men were digging with their hands among the still smoking debris of some large grocery house for canned goods. When they secured it, which

they did without molestation from anybody, they broke the tins and drank the contents.

At Filbert and Van Ness avenue at 6 o'clock at night a wagon of supplies conveyed by soldiers was besieged by a crowd of hungry people. They appealed to the soldiers for food and their appeals were quickly heeded. Seizing an ax a soldier smashed the boxes and tossed the supplies to the crowd, which took time to cheer lustily.

Owing to the energetic efforts of General Funston and the officials of the Spring Water Company the sufferers in all parts of the city were spared at least the horrors of a water famine. As soon as it was learned that some few mercenaries who were fortunate enough to have fresh water stored in tanks in manufacturing districts were selling it at 50 cents per glass the authorities took prompt action and hastened their efforts to repair the mains that had been damaged by the earthquake shocks.

The work of relief was started early on the second day of the disaster. A big bakery in the saved district started its fires and 50,000 loaves were baked before night. The police and military were present in force and each person was allowed only one loaf.

The destitution and suffering were indescribable. Women and children who had comfortable, happy homes a few days before slept—if sleep came at all—on hay on the wharves, on the sand lots near North beach, some of them under the little tents made of sheeting which poorly protected them from the chilling ocean winds. The people in the parks were better provided in the matter of shelter, for they left their homes better prepared.

Instructions were issued by Mayor Schmitz to break open every store containing provisions and to distribute them to the thousands under police supervision.

At one time bread sold as high as $1 a loaf and water at fifty cents a glass, but the authorities at once put a stop to the extortion.

Among the many pathetic incidents of the fire in San Fran-

cisco was that of a woman who sat at the foot of Van Ness avenue on the hot sands on the hillside overlooking the bay east of Fort Mason with four little children, the youngest a girl of three, the eldest a boy of ten.

They were destitute of water, food and money. The woman had fled with her children from a home in flames in the Mission street district and tramped to the bay in the hope of sighting the ship, which she said was about due, of which her husband was the captain.

"He would know me anywhere," she said. And she would not move, although a young fellow gallantly offered his tent back on a vacant lot in which to shelter her children.

Among the refugees who found themselves stranded were John Singleton, a Los Angeles millionaire, his wife and her sister. The Singletons were staying at the Palace Hotel when the earthquake shock occurred on Wednesday morning.

Mr. Singleton gave the following account of his experience: "The shock wrecked the rooms in which we were sleeping. We managed to get our clothes on and get out immediately. We had been at the hotel only two days and left probably $3,000 worth of personal effects in the room.

"After leaving the Palace we secured an express wagon for $25 to take us to the Casino near Golden Gate park, where we stayed the first night. On the following morning we managed to get a conveyance at enormous cost and spent the entire day in getting to the Palace. We paid $1 apiece for eggs and $2 for a loaf of bread. On these and a little ham we had to be satisfied."

Mr. Singleton, like thousands of other people, found himself without funds and he had difficulty in securing cash until he met some one who knew him.

To allay the fears of the refugees in the various camps Mayor Schmitz issued the following proclamation which citizens were instructed to observe:

"Do not be afraid of famine. There will be abundance of food

supplied. Do not use any water except for drinking and cooking purposes. Do not light fires in houses, stoves or fireplaces. Do not use any house closets under any circumstances, but dig earth closets in yards or vacant lots, using if possible chloride of lime or some other disinfectant. This is of the greatest importance, as the water supply is only sufficient for drinking and cooking. Do not allow any garbage to remain on the premises; bury it and cover immediately. Pestilence can only be avoided by complying with these regulations.

"You are particularly requested not to enter any business house or dwelling except your own, as you may be mistaken for one of the looters and shot on sight, as the orders are not to arrest but shoot down any one caught stealing."

The refugees numbered all told about 300,000. At least 75,000 of them made their way to Oakland, Berkeley, Alameda, Benicia and neighboring cities while many more fortunate and prosperous succeeded in reaching Los Angeles.

The work of caring for the homeless in the refugee camps was splendidly managed under the direction of the citizens' committee, the military authorities and the Red Cross.

The people were fed in a thoroughly businesslike and systematic manner. From the water front, where the boatloads of provisions docked, there was an endless procession of carts and drays carrying food to the scores of substations established throughout the city and the parks. At these stations food and drink, comprising bread, prepared meats and canned goods, milk and a limited amount of hot coffee, were served to all those who applied. About 1,500 tons of provisions were moved daily from the water front.

Large supplies of blankets, tentings and other material to provide coverings for those who were scantily supplied theretofore reached the supply stations rapidly. Barracks were erected at several points and in those many people have found comfort and shelter against the inclemencies of the weather.

The situation in the congested districts such as Golden Gate Park and the various public squares throughout the city, was considerably relieved by the departure of many people for points on the other side of the bay, as soon as access was had to the ferry building. The exodus continued daily from the time the fire broke out until every one who wished to get away had departed.

The greatest hardship experienced by the homeless refugees was on the first Sunday night following the fire.

From midnight Sunday until 3 o'clock Monday morning a drenching rain fell at intervals, while a high wind added a melancholy accompaniment, whistling and sighing about the ruins of the buildings in the burned district. Five days before when the fire catastrophe was in its infancy this downpour would have been regarded as a mercy and a godsend.

When it came it could be regarded in no other light than as an additional calamity. It meant indescribable suffering to the tens of thousands of people camped upon the naked hills and in the parks and open places of the city.

Few of them were provided with water-proof covering. For the most part their only protection from the wet was a thin covering of sheeting tacked upon improvised tent-poles. Through this the water poured as through a sieve, wetting the bedding and soaking the ground upon which they lay.

When it is understood that thousands upon thousands of delicately nurtured women and infants in arms and old and feeble people were in this plight nothing need be added to describe the misery of their condition.

What could be done was done by the guards in charge of the camps to relieve the distress. Whenever covering could be had for the women and children it was taken advantage of. They were housed in the chill and cheerless churches, garages and barns, and those who had been fortunate enough to save their homes were called upon to take care of these unfortunates. With few exceptions these people responded readily to the new call

made upon them and where they did not the butt ends of Krag rifles quickly forced a way through inhospitable doors.

Of individual instances of suffering the whole number is legion, but one will tell the story of them all.

About 4 o'clock, when the rain had been falling heavily for an hour, a middle-aged man, white-faced in his distress and fatigue, appeared at the headquarters of the general committee. He had walked two miles from his camping place in the park to make an appeal for his suffering wife and little ones. As he told of their distress the tears welled up in his eyes and coursed down his cheeks.

They were, he said, without covering other than a sheeting overhead and were lying on the naked ground and their bodies protected only by a quilt and blanket, which of his household bedding were all he had managed to save. These had quickly been soaked, and while unwilling to complain on his own account he had been unable to listen to the wails of his little ones and had tramped all the way from his camping place to the committee headquarters in the forlorn hope that there he might find some means of getting his family under shelter.

The condition of the 5,000 people or more camped in Jefferson Square Park was something terrible. Not more than 5 per cent had even an army tent and the makeshifts were constructed of carpets, bed sheets and every imaginable substance. They were totally inadequate to keep out the heavy rain.

The 400 soldiers of the Fifth and Sixth California National Guard were requisitioning.

Glenn A. Durston of the Spanish War Veteran's relief committee, had charge of the relief work.

The spirit and courage shown by the sufferers in the face of their misfortunes was wonderful. An aged, crippled woman lying on the dirt floor of patchwork, bed sheets, carpets and tin roofing made a remark which was a sample.

"I am the widow of a union soldier," she said. "The suffer-

ings related by my husband at Vicksburg were as nothing compared to mine. I am very comfortable, thank you."

Many temporary emergency hospitals were established in and near the refugee camps. The St. Paul Lutheran church near Jefferson square was one, but the big hospital at the Presidio, the military headquarters of the government, provided for the greater number of cases.

A temporary detention hospital was also established in the basement of the Sacred Heart school, conducted by the Dominican Sisters at the corner of Fillmore and Hayes streets, and the first commitment since the earthquake was made on the Sunday following the fire. The sisters of the Sacred Heart kindly turned over a part of the already crowded quarters to the insanity commissioners, and a number of patients made insane by the fire were cared for there.

At the general hospital the wards were soon full of patients, but few were suffering from severe types of sickness. There were many cases of tonsilitis, colds and such ills.

Within a week after the fire thousands of people left the refugee camps and found homes with friends in nearby places. One week after the disaster the authorities estimated that the number of campers on the grounds had been reduced to less than 8,000, where over 30,000 people had camped.

Temporary structures were erected in Golden Gate Park for the housing of 40,000 people, who had been sleeping out of doors for nearly a week and they were moved into comfortable quarters. About the same time a supply of blankets and bedding was received.

Within a week from the beginning of the disaster the refuge camps were converted into comfortable places of residence, with adequate sanitation, and the homeless at least had temporary homes. All this was accomplished with a minimum of suffering and illness that speaks volumes for the courage, energy and common sense of the American people.

RUINS OF MARK HOPKINS ART INSTITUTE. After the fire, nothing remained of this magnificent structure with its almost invaluable art treasures, but a few smoldering charred walls. It was built by Mark Hopkins on Nob Hill, and was owned by the University of California.

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AFTER THE FIRE. Wherever the eye turned there were nothing but ruins of once fine buildings. The above structures were occupied by the Fisher and Alacazar Theatres and the Delmonico restaurant.

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CHAPTER XIV.

RUINS AND HAVOC IN COAST CITIES.

San Jose, the Prettiest Place in the State, Wrecked by Quake—State Insane Asylum Collapsed and Buried Many Patients Beneath the Crumbled Walls—Enormous Damage at Santa Rosa.

OUTSIDE of San Francisco the earthquake did immense damage for fifty miles north and south of the Golden Gate City. San Jose, the prettiest city in California, sustained the severest shock, which killed a score of people and left the business section a pile of ruins. The loss in this one city alone amounted to $5,000,000.

The State Insane Asylum at Agnews near San Jose collapsed and buried upwards of 100 patients beneath its walls.

Among the buildings wrecked in San Jose are St. Patrick's church, the First Presbyterian church, the Centella Methodist Episcopal church, the Central Christian and South Methodist churches.

Every building on the west side of First street from St. James park to San Fernando street either went down, toppling or was badly cracked. The Auzerias building, Elks club, Unique theater and many other buildings on Santa Clara street went down to the ground.

On Second street the six-story Dougherty building and several adjoining blocks were destroyed by fire. A new high school in Normal Park was a complete wreck.

The Nevada & Porter building on Second street, the Rucker building on Third and Santa Clara streets were also ruined.

The annex to the Vendome Hotel was completely wrecked, and one man was killed therein.

Sheriff William White, of Los Angeles, who was in San Jose

at the time attending a convention, thus describes the scenes following the quake:

"San Jose, which was the prettiest city in California, is the worst-looking wreck I ever saw. When I left there nineteen dead bodies had been recovered and there was a possibility that others would be found. I reached Agnew Asylum a few hours later in an automobile and was one of the first on the spot. There I helped to carry out sixty corpses. At noon, when I arrived at San Jose, it was believed that fully 100 bodies were still in the ruins.

"The shock came to San Jose exactly at 5:12:45, according to the clock in the St. James Hotel, which was stopped. Supreme Court Clerk Jordan, my young nephew; Walter Jordan and myself occupied apartments on the fourth floor of the St. James Hotel. The shock awoke the three of us, but only seemed to disturb my nephew, who commenced calling out.

"There was not a brick or stone building of two stories or over in San Jose that was not leveled to the ground or so badly damaged it will have to be torn down. Some fires started after the quake, but the fire department soon had them under control.

"I secured an automobile at 7 o'clock and left for Agnew, where the insane asylum was located, with two or three of the visiting sheriffs. The sight there was awful. The walls were standing, but the floors had all fallen in.

"Scores of insane persons were running about in the grounds, unwatched and uncared for. I helped to take out the body of Dr. Kelly, the assistant superintendent of the asylum, who had been instantly killed. A nurse who was also taken out of the ruins by me died a little later.

"After getting away from San Jose I saw evidences of the earthquake at Niles and even as far as Livermore in the shape of fallen chimneys and broken glass."

The main building of the State Hospital collapsed, pinning many of the patients under fallen walls and debris. The padded

cells had to be broken open and more dangerous patients were tied to trees out on the lawn in lieu of a safer place. The doctors and nurses stuck heroically to their posts and 100 students from Santa Clara College went over in a body and assisted in succoring the wounded.

State Senator Cornelius Pendleton, who escaped the earthquake shock at San Jose, thus narrated his experiences:

"We were all at the Vendome Hotel. The shock of the earthquake was so severe the floors and walls of the building collapsed at once and those of us who escaped made our way as best we could out of the ruins. On the side of the hotel where my room was there was a large tree. The side wall of my room fell against this tree, which also sustained that portion of the roof, preventing it from falling in on us.

"My room was on the second floor, but when I picked myself up I was in the basement of the building. I crawled up and out over the debris and escaped through a window on a level with the ground. After getting out I found this was one of the third story windows. Those of us who were uninjured at once set about assisting the less fortunate. I saw one dead woman in the hotel. We carried her out. The remainder of the dead were in various parts of the town. The residence district was not badly damaged. Martial law had been declared in the city when we left.

"Among the large buildings that were totally demolished were the Hall of Justice, the First Presbyterian Church, the Catholic Cathedral, the Hale Block, and the Vendome Hotel. Fire broke out following the earthquake in several quarters, but fortunately the water mains were uninjured and the spread of the flames was checked."

At Salinas the immense plant of the Spreckles Sugar refinery was completely destroyed, and the loss of property aggregated $2,000,000.

The estimated loss of life and damage in California cities outside of San Francisco is as follows:

Oakland, $500,000, 5 lives; Alameda, $400,000; San Jose, $5,000,000, 19 lives; Agnew (state hospital for insane), $400,000, 170 lives; Palo Alto (Stanford University), $3,000,000, 2 lives; Napa, $250,000; Salinas, $2,000,000; Hollister, $100,000, 1 life; Vallejo, $40,000; Sacramento, $25,000; Redwood City, $30,000; Suisun, $50,000; Santa Rosa, $800,000, 40 lives; Watsonville, $70,000; Monterey, $25,000, 8 lives; Loma Prieta, 10 lives; Stockton, $40,000; Brawley, $100,000; Santa Cruz, $200,000; Gilroy, $500,000; Healdsburg, $25,000; Cloverdale, $15,000; Geyserville, $12,000; Hopland, $10,000; Ukiah, $50,000; Alviso, $20,000; Niles, $10,000; Hinckley Creek, $10,000, 9 lives; Deer Creek Mill, $10,000, 2 lives; Santa Clara, $500,000; Pacific Grove, $50,000; Wrights, $75,000; Delmonte, $25,000, 2 lives.

The beautiful city of Santa Rosa was a terrible sufferer from the quake, both in loss of life and property:

The entire business section was left in ruins and practically every residence in the town was more or less damaged, fifteen or twenty being badly wrecked. The damage to residences was caused principally by the sinking of the foundations, which let many structures down on to the ground.

The brick and stone business blocks, together with the public buildings, were all thrown flat. The courthouse, Hall of Records, the Occidental and Santa Rosa hotels, the Athenaeum theater, the new Masonic Temple, Odd Fellows' block, all the banks—everything—went, and in all the city not one brick or stone building was left standing except the California Northwestern depot.

It was almost impossible for an outsider to realize the situation as it actually existed there. No such complete destruction of a city's business interests ever before resulted from an earthquake in America. The very completeness of the devastation was really the redeeming feature, though, for it put all upon exactly the same basis, commercially speaking. Bankers and millionaires went about with only the few dollars they happened

to have in their pockets when the crash came, and were little better off than the laborers who were digging through the debris. Money had practically no value, for there was no place to spend it, and this phase of the situation presented its own remedy. Almost every one slept out of doors, being afraid to enter their homes except for a short while at a time until repairs were made.

There were plenty of provisions. Some were supplied by other towns and much was brought in from the surrounding country. Two entire blocks of buildings escaped being swept by the flames, which immediately broke out in a dozen places at once as soon as the shock was over and from the tangled ruins of those buildings complete stocks of groceries and clothing were dug out and added to the common store. Then before the fire gained headway several grocery stores were emptied of their contents in anticipation of what might follow.

The city was put under martial law, company C of Petaluma having been called to assist the local company in preserving order. Many deputy sheriffs and special police were also sworn in, but no trouble of any kind occurred.

The relief committee was active and well managed and all in need of assistance received it promptly. The work that required the principal attention of the authorities was removal of the wreckage in order to search for the bodies of those missing and known to have perished.

Forty marines under command of Captain Holcombe arrived from Mare Island and did splendid work in assisting in the search. Forty-two bodies were buried in one day and the total dead and missing numbered upward of 100.

Santa Rosa, in proportion to its size, suffered worse than San Francisco. Mr. Griggs, who was in the employ of a large firm at Santa Rosa, tells a story which sufficiently proves the earthquake's fury, so great as to practically reduce the town to

ruin. In addition to the death roll a large number of persons were missing and a still greater number were wounded.

As in the case of San Francisco, an admirable organization had the situation well in hand. Forty sailors from Mare Island, fully equipped with apparatus, were at work, while volunteer aid was unstinted.

Santa Rosa suffered the greatest disaster in her history, but the indomitable spirit of her people was shown all along the line. Even so early as Friday an announcement was made that the public schools and the college would open as usual on Monday morning, the buildings having been inspected and found to be safe.

At Agnews the cupola over the administration department went down and all the wards in that part of the building collapsed. Twelve attendants were killed and Dr. Kelly, second assistant physician, was crushed to death. There were 1,100 patients in the hospital. C. L. Seardee, secretary of the state commission in lunacy, who was in Agnews and attending to official business, declared that it was a marvel that many more were not killed. Dr. T. W. Hatch, superintendent of the state hospitals for insane, was in charge of the work of relief.

Friday morning 100 patients were transferred to the Stockton asylum. Forty or fifty patients escaped.

Dr. Clark, superintendent of the San Francisco County Hospital, was one of the first to give relief to the injured at Agnews. He went there in an automobile, taking four nurses with him, and materially assisted the remaining members of the staff to organize relief measures.

Tents were set up in the grounds of the institution, and the injured as well as the uninjured cared for. A temporary building was erected to house the patients.

The St. Rose and Grand hotels at Santa Rosa collapsed and buried all the occupants. Thirty-eight bodies were taken from the ruins. There were 10,000 homeless men, women and chil-

dren huddled together about Santa Rosa. As the last great seismic tremor spent its force in the earth, the whole business portion tumbled into ruins. The main street was piled many feet deep with the fallen buildings.

The destruction included all of the county buildings. The four story courthouse, with its dome, is a pile of broken masonry. What was not destroyed by the earthquake was swept by fire. The citizens deserted their homes. Not even their household goods were taken. They made for the fields and hills to watch the destruction of one of the most beautiful cities of the west.

C. A. Duffy of Owensboro, Ky., who was in Santa Rosa, was the only one out of several score to escape from the floor in which he was quartered in the St. Rose hotel at Santa Rosa. He went to Oakland on his motor cycle after he was released and told a thrilling story of his rescue and the condition of affairs in general at Santa Rosa.

Mr. Duffy said when the shock came he rushed for the stairway, but the building was swaying and shaking so that he could make no headway, and he turned back. He threw himself in front of the dresser in his room, trusting to that object to protect him from the falling timbers. This move saved his life. The dresser held up the beams which tumbled over him, and these in turn protected him from the falling mass of debris.

"I was imprisoned five hours," said Mr. Duffy, "before being rescued. Three times I tried to call and the rescuers heard me, but could not locate my position from the sound of my voice, and I could hear them going away after getting close to me.

"Finally I got hold of a lath from the ruins around me, poked it through a hole left by the falling of a steam pipe, and by using it and yelling at the same time finally managed to show the people where I was.

"There were about 300 people killed in the destruction of the three hotels.

"The business section of the place collapsed to the ground al-

most inside of five minutes. Then the fire started and burned Fourth street from one end to the other, starting at each end and meeting in the middle, thus sweeping over the ruins and burning the imprisoned people.

"I saw two arms protruding from one part of the debris and waving frantically. There was so much noise, however, that the screams could not be heard. Just then, as I looked, the flames swept over them and cruelly finished the work begun by the earthquake. The sight sickened me and I turned away."

Fort Bragg, one of the principal lumbering towns of Mendocino county, was almost totally destroyed as a result of a fire following the earthquake of April 18.

The bank and other brick buildings were leveled as a result of the tremors and within a few hours fire completed the work of devastation. But one person of the 5,000 inhabitants was killed, although scores were injured.

Eureka, another large town in the same county, fifty miles from Fort Bragg, was practically undamaged, although the quake was distinctly felt there.

Relief expeditions were sent to Fort Bragg from surrounding towns and villages and the people of the ruined area were well cared for.

The town of Tomales was converted into a pile of ruins. All of the large stores were thrown flat. The Catholic church, a new stone structure, was also ruined. Many ranch houses and barns went down. Two children, Anita and Peter Couzza, were killed in a falling house about a mile from town.

The towns of Healdsburg, Geyserville, Cloverdale, Hopland, and Ukiah were almost totally destroyed. The section in which they were located is the country as far north as Mendocino and Lake counties and as far west as the Pacific ocean. These are frontier counties, and have not as large towns as farther south. In every case the loss of life and property was shocking.

At Los Banos heavy damage was done. Several brick buildings were wrecked. The loss was $75,000.

Brawley, a small town on the Southern Pacific, 120 miles south of Los Angeles, was practically wiped out by the earthquake. This was the only town in southern California known to have suffered from the shock.

Buildings were damaged at Vallejo, Sacramento, and Suisun. At the latter place a mile and a half of railroad track is sunk from three to six feet. A loaded passenger train was almost engulfed.

R. H. Tucker, in charge of the Lick observatory, near San José, said: "No damage was done to the instruments or the buildings of the observatory by the earthquake."

At Santa Cruz the courthouse and twelve buildings were destroyed. Contrary to reports, there must have been a tidal wave of some size, for three buildings were carried away on Santa Cruz beach.

The Moreland academy, a Catholic institution at Watsonville, was badly damaged, but no lives lost.

In a Delmonte hotel a bridal couple from Benson, Ari.—Mr. and Mrs. Rouser—were killed in bed by chimneys falling.

At 12:33 o'clock on the afternoon following the San Francisco quake Los Angeles experienced a distinct earthquake shock of short duration. Absolutely no damage was done, but thousands of people were badly frightened.

Men and women occupants of office buildings, especially the tall structures, ran out into the streets, some of them hatless. Many stores were deserted in like manner by customers and clerks. The shock, however, passed off in a few minutes, and most of those who had fled streetwards returned presently.

The San Francisco horror has strung the populace here to a high tension, and a spell of sultry weather serves to increase the general nervousness.

CHAPTER XV.

DESTRUCTION OF GREAT STANFORD UNIVERSITY.

California's Magnificent Educational Institution, the Pride of the State, Wrecked by Quake—Founded by the Late Senator Leland Stanford as a Memorial to His Son and Namesake—Loss $3,000,000.

ONE of the most deplorable features of the great California calamity was the destruction of the Leland Stanford, Jr., University, situated at Palo Alto.

The magnificent buildings, including a beautiful memorial hall erected by Mrs. Stanford to the memory of her husband and son, were practically wrecked.

Leland Stanford University was one of the most richly endowed, most architecturally beautiful, and best equipped institutions of learning in the world. Mrs. Jane Stanford, widow of the school's founder, in 1901 gave it outright $30,000,000—$18,000,000 in gilt edged bonds and securities and $12,000,000 in an aggregate of 100,000 acres of land in twenty-six counties in California. This, with what the university had received from Leland Stanford himself, made its endowment the enormous sum of $34,000,000 besides its original capital, and on the death of Mrs. Stanford this was raised to $36,000,000.

In a way the real founder of the university was a young boy, Leland Stanford, Jr. On his death bed he was asked by his parents what he would like them to do with the vast fortune which would have been his had he lived. He replied he would like them to found a great university where young men and women without means could get an education, "for," he added, "that is what I intended all along to do before I knew I was going to die."

The dying wish was carried out.

The foundation stone was laid on the nineteenth anniversary of the boy's birth, and in a few years there sprang into existence at Palo Alto, about thirty-three miles southeast of San Francisco, the "Leland Stanford University for Both Sexes," with the colleges, schools, seminaries of learning, mechanical institutes, museums, galleries of art, and all other things necessary and appropriate to a university of high degree, with the avowed object of "qualifying students for personal success and direct usefulness in life."

The architecture was a modification of the Moorish and Romanesque, with yet a strong blending of the picturesque mission type, which has come down from the early days of Spanish settlement in California. Driving up the avenue of palms from the university entrance to the quadrangle, one was faced by the massive, majestic memorial arch. Augustus St. Gaudens, the great sculptor, embodied in his noblest conceptions in the magnificent frieze which adorned the arch.

However beautiful the other buildings, they were easily surpassed by the marvelous Memorial Church, which was built at a cost of $1,000,000.

The organ in this magnificent new edifice was the largest and most expensive in the world. It had nearly 3,000 pipes and forty-six stops. The church was 190 feet in length and 156 feet in width. It cost $840,000.

The substantial magnificence of Memorial Church was followed in every line of the university's program. The assembly hall and the library were adjoining buildings of the outer quadrangle. The former had a seating capacity of 1,700, and with its stage and dressing rooms possessed all the conveniences of a modern theater.

When Stanford University opened its doors almost fifteen years ago people thought the Pacific coast was too wild and woolly to support Stanford in addition to the big state university

at Berkeley, Cal., and, as President David Starr Jordan remarked: "It was the opinion in the east that there was as much room for a new university in California as for an asylum of broken down sea captains in Switzerland."

But Stanford grew steadily and rapidly, until last year its attendance was more than 1,600. Its president is David Starr Jordan.

The gateway to the university is opposite the town of Palo Alto, which has a population of 4,000. It is surrounded by part of its endowment, the magnificent Palo Alto estate of seventy-three hundred acres. The value of the total endowment is estimated at $35,000,000. The university buildings are the most beautiful group of public buildings in America. They are but parts of one plan, and are constructed of Santa Clara Valley brown sandstone throughout—beautiful and restful in color and in pleasing contrast to the walls of green of the surrounding hills and the great campus in front. The buildings of the university are not piled sky high, but with long corridors rise two stories, for the most part completely enclosing a beautiful quadrangle, in itself about a ninth of a mile long by eighty yards broad. The massive memorial arch in front, and the beautiful Memorial Church, with its cathedral-like interior, great arches and allegorical windows, are the most imposing features of the group. Flanking the main buildings to the right is Encina Hall for the boys and Roble Hall for the girls, while across the campus are the new chemistry building and the museum. The large grounds are most carefully tended, and all the flowers and trees and shrubs that help beautify California find a home here. The walks and drives are delightful. There is no other alliance of buildings and surrounding grounds quite so pleasing as those of Stanford University. Tuition at the University is free, and the equipment is that naturally to be expected in the richest endowed university in the world. The students of the present semester number fifteen hundred. Financial figures mean but little in connection

with a university—and yet since the new church is not describable, it may be mentioned that it cost $500,000. The buildings represent an expenditure of several million dollars.

To reach Palo Alto and Stanford University one has to travel from San Francisco thirty-three miles southward over the coast line of the Southern Pacific road. The town of Palo Alto is situated in the Santa Clara Valley—a riverless area of bottomland lying between San Francisco bay and the Santa Cruz range. The Santa Clara Valley is one of the various vales found here and there about the continent which proudly lay claim to the title "garden spot of the world."

The Memorial Church was Mrs. Stanford's gift to the university from her private fortune, was dedicated "to the glory of God and in loving memory of my husband, Leland Stanford." Its erection and administration were matters entirely apart from the regular university control. In terms of money, it probably cost over $1,000,000. Clinton Day of San Francisco drew the plans, which were complemented in a hundred ways, from the ideas of Mrs. Stanford herself and suggestions obtained by her from a scrutiny of old world cathedrals.

The building of the university was decided upon by Mr. and Mrs. Leland Stanford in March, 1884, after their only son had died in Italy at the age of 16. Construction began, May 14, 1887, the anniversary of the boy's birth, and instruction October 1, 1891. As for the name, here is the joint declaration of the Stanfords: "Since the idea of establishing an institution of this kind came directly and largely from our son and only child, Leland, and in the belief that had he been spared to advise as to the disposition of our estate he would have desired the devotion of a large portion thereof to this purpose, we will that for all time to come the institution hereby founded shall bear his name and shall be known as the Leland Stanford Junior University." The object was declared to be "to qualify students for personal success and direct usefulness in life." On the title page of the first register

ever printed and of every one since, appear these words of Senator Stanford's: "A generous education is the birthright of every man and woman in America." This and President Jordan's favorite quotation, "Die Luft der Freheit weht"—"the winds of freedom are blowing," reveal somewhat the genius of the place.

The major study was the key to Stanford's elective system of instruction. The ordinary class divisions were not officially recognized. Even the students until recently made far less of the terms "freshmen," "sophomore," "junior" and "senior," than is made of them at most colleges. Each student elected at the start some major study, by which he steered his course for the four years, unless he changed "majors," which was not unusual or inadvisable during the first two years, for after they had "learned the ropes" students naturally gravitated to the department whose lines they are best fitted to follow. The Stanford departments numbered 23, as follows: Greek, Latin, German, Romantic languages, English, philosophy, psychology, education, history, economics, law, drawing, mathematics, physics, chemistry, botany, physiology, zoology, entomology, geology and mining, civil engineering, mechanical engineering, electrical engineering.

The chosen site of the university was part of the great Palo Alto ranch of the Stanfords, devoted to the raising of grain, grapes and the famous trotting horses that were "the Senator's" hobby and California's pride. It resembled the Berkeley situation, in that the bay lies before it and the foothills of the Santa Cruz range behind, but the former is three miles away and the Palo Alto country is so level that only when one climbs the rolling slopes behind the college does he realize that the great inlet is so near. The view from the foothills, by the way, or better still from the crest of the mountain range farther back, where the Pacific ocean roars away to the westward and the valley and bay appear to divide the space between you and the mountains that cut the horizon to the east, is one of California's treasures.

The idea that made the Spanish mission the model for the Stanford buildings was translated into plans by Shepley, Rutan and Cooledge. If ever there was an inspiration, says the visitor, this was one. Ever so many millions put into ever so ornate structures of the type prevalent elsewhere could not give these halls their appealing beauty. The main group of buildings formed two quadrangles. The 12 one-story members of the inner quadrangle were ready in 1891, and with the shops of the engineering departments, were for several years "the university." The 12 structures of the inner quad were increased to 13, for the church, provided for in the original scheme, but not begun until 1899, was added. Those inclosed—to quote statistics from the register—a court 586 feet long by 246 feet wide—3¼ acres—relieved from barrenness by big circular plots in which flourished palms, bamboos and a medley of other tropical translations. Penetrate 10 feet into one of these plots, which are always damp from much watering, and it takes little imagining to fancy yourself in an equatorial jungle. Surrounding this quadrangle was another—the "outer quad," of 14 buildings that were bigger and higher and considerably more impressive than the pioneers. The extreme length of the second quadrangle was 894 feet. All the way around it stretched the same colonnades, with their open-arched facades, that flanked the inner court. And in addition the outer and inner quadrangles were connected here and there with these same arched pathways, which subdivide the space between the two into little reproductions in miniature of the main plaza within. The colonnades, the tiled roofs and peculiar yellow sandstone of which all the quadrangles were constructed formed a combination which is not easily nor willingly forgotten.

Outside this central group, of which the great church and the memorial arch were badly wrecked by the quake, were enough other buildings used for the university proper to bring the number up to fifty or so. They include chemistry building, museum, library, gymnasium, engineering and two dormitories—one, Roble hall, for women; the other, Encina hall, for men.

The ruins wrought among those magnificent buildings by the frightful upheaval of the earth which wrenched some of them apart and threw down huge sections of walls aggregated in money value about $3,000,000.

The gymnasium and the library were wholly destroyed, nothing but skeletons of twisted steel remaining. The loss was half a million dollars on each. The Memorial church was left merely a frame, the mosaic work being torn down. The top of the 80-foot high memorial arch was crashed to the ground a heap of ruins. The original quadrangle was but little damaged. Many rare specimens from Egypt were lost in the museum, which was only partly destroyed. The fraternity lodge and Chi Psi Hall were a total loss. The engineering buildings were partly demolished. Encina Hall, where 200 boys stayed, was much shaken, and a large stone chimney crashed through the four floors, burying student Hanna, of Bradford, Pa. He was the only student killed. About twelve others were slightly hurt.

Roble Hall, women's dormitory, escaped without a scratch.

The damage at Palo Alto City amounts to $200,000. The damage in the neighboring towns was also heavy. San Mateo suffered more than Palo Alto. The Redwood city jail was torn down and all the prisoners escaped.

There was severe damage at Menlo Park. Burlingame suffered a loss of fully $100,000. Many houses were torn down there. The only other death in that vicinity was that of Fireman Otto Gordes, who was buried under the chimney of the power house at Palo Alto.

All the towns mentioned were left without light or power.

President David Starr Jordan of Stanford University announced that the university authorities would begin at once to repair the quadrangle, laboratories and dormitories. The Memorial church was sheltered to prevent further injury and work in all classes was resumed on April 23.

President Jordan said that it was unlikely any attempt would

SAN FRANCISCO AFTER THE FIRE. The building on the right was occupied by the Tivoli Theatre, and the Poodle Dog Restaurant is across the street to the left. The men in the foreground are refugees with their household effects carried on their backs.

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RUINS OF CITY HALL. This is another view of this famous building, and shows at close range the terrible effect of the earthquake on stone and mortar.

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be made to restore the Memorial church, the memorial arch, the new library, the gymnasium or the museum of the university.

The great rival of the Leland Stanford, Jr., University is the University of California at Berkeley, a suburb of San Francisco. The effect of the earthquake there is tersely told by Professor Alpheus B. Streedain of the zoological department. There were eight severe shocks in succession.

"It all lasted about twenty-five seconds," said Professor Streedain, "and talk about being frightened, to be more expressive I thought hell was coming to earth. I rushed down to the street in my pajamas, and people were almost crazy. Chimneys were down all over. I was safe and trusted to God for any coming shocks. It was a mighty serious proposition, and one I shall never forget."

By a seeming miracle the big California University buildings that stand on the campus elevations escaped harm in the earthquake shock.

Recorder James Sutton of the University said: "I made a personal examination of the buildings on the campus and received reports from deans of the colleges and it appears that not one of the buildings was harmed in the slightest degree.

"Professor O'Neill of the chemistry department reported that the damage done to the instruments in the building did not aggregate more than $50. California Hall had not a mark on it to indicate that an earthquake occurred that morning. The other buildings were in the same condition. The Greek theater had not a scratch on its walls."

The town of Berkeley was not so fortunate as the university in the matter of damage sustained. No lives were lost, nor were there any notable disasters to buildings, but the aggregate damage in the shape of twisted structures, broken chimneys and falling walls was many thousands of dollars.

The destruction of so many magnificent buildings at the Leland Stanford, Jr., University was one of the worst calamities that has ever befallen an American educational institution.

CHAPTER XVI.

FIGHTING FIRE WITH DYNAMITE.

San Francisco Conflagration Eventually Checked by the Use of Explosives — Lesson of Baltimore Heeded in Coast City — Western Remnant of City in Residence Section Saved by Blowing Up Beautiful Homes of the Rich.

THE remnant of San Francisco that escaped destruction in the four days conflagration owes its existence largely to the equally destructive force of dynamite. For four days one agent of destruction was employed against another.

The San Francisco conflagration was the second great fire in the United States at which dynamite was the chief agency of the fire fighters. Immediately following the first earthquake crash flames burst forth in numerous places, chiefly in the business section of the city. The fire department responded as promptly as possible under the circumstances for a new difficulty presented itself to the firemen. When the clang of the alarm sounded it was found that many of the engine houses had been damaged by the quake and so twisted that it was only with difficulty that the apparatus could be gotten out of the buildings. Upon arriving at the several scenes of the fire a worse calamity confronted them. The engines were attached to the hydrants and then followed the alarming cry:

"No water!"

The mains had been bursted, twisted and torn asunder by the violence of the shock, and only in rare instances could water be found wherewith to combat the rapidly spreading flames.

Then it was that the new method of checking conflagrations

was brought into use, and the order was given to fight the flames with dynamite. Doubtless the officials of the department had freshly in mind the great Baltimore fire in which the city was saved only from total destruction by the use of an immense amount of explosives. Fire chief Denis Sullivan and his wife had both been injured by the earthquake, the former having been fatally hurt, so that in addition to the hopeless situation which confronted the firemen they were without the guidance of their principal leader.

There was little dynamite available in the city, but what was on hand was immediately brought into use and soon the terrific explosions added to the terror of the panic stricken people fleeing from the flames.

At 9 o'clock on the first day of the fire Mayor Schmitz sent a tug to Pinole for several cans of the explosive. He also sent a telegram to Mayor Mott of Oakland. He received this reply to his Oakland message: "Three engines and hose companies leave here immediately. Will forward dynamite as soon as obtained."

All outside nearby places were appealed to for dynamite and as fast as the explosive was received it was directed against large buildings in the path of the fire. The crash of falling walls mingled with the reverberations of the explosions, led many to believe that the earthquake shocks were being repeated. Here and there a fireman went down beneath the ruins as some huge building tumbled to the ground shattered by the destructive explosive. In the downtown districts the efforts of the dynamiters were wholly unavailing. The fire had gained such headway that it swept with a roar over every vacant space made by the explosive and continued its consuming way in every direction.

Better success was obtained in the residence district west on the second day of the fire. The widest thoroughfare in the city is Van Ness avenue in the heart of the fashionable residence section. There is was decided that an effort should be made to check the spread of the flames westward and save the many beau-

tiful homes in the district between that avenue and the water line.

The co-operation of the artillery was secured and huge cannons were drawn to the avenue by the military horses to aid the dynamiters in blowing up the mansions of the millionaires on the west of Van Ness avenue in order to prevent the flames from leaping across the highway and starting on their unrestraining sweep across the western addition.

Every available pound of dynamite was hauled to that point and the sight was one of stupendous and appalling havoc as the cannons were trained on the palaces and the shot tore into the walls and toppled the buildings in crushing ruins. At other points the dynamite was used, and house after house, the dwellings of millionaires, was lifted into the air by the bellowing blast and dropped to the earth a mass of dust and debris.

The work was necessarily dangerous and many of the exhausted workers who kept working through a stretch of forty-eight hours without sleep and scarcely any food through force of instinctive heroism alone were killed while making their last desperate stand.

Many of the workers in placing the blasts, took chances that spelled injury or death. The fire line at 6 o'clock extended a mile along the east side of Van Ness avenue from Pacific street to Ellis. All behind this excepting the Russian Hill region and a small district lying along the north beach had been swept clean by the flames and the steel hulks of buildings and pipes and shafts and spires were dropped into a molten mass of debris like so much melted wax.

The steady booming of the artillery and the roar of the dynamite above the howl and cracking of the flames continued with monotonous regularity. Such noises had been bombarding the ears of the panic-stricken people since the earthquake of forty-eight hours before. They ceased to hear the sound and rush pell-mell, drowning their senses in a bedlam of their own creation. There seemed to be an irresistible power behind the flames

that even the desperately heroic measures being taken at Van Ness avenue could not stay.

Hundreds of police, regiments of soldiers, and scores of volunteers were sent into the doomed district to inform the people that their homes were about to be blown up, and to warn them to flee. They heroically responded to the demand of law, and went bravely on their way trudging painfully over the pavements with the little they could get together.

Every available wagon that could be found was pressed into service to transport the powder from the various arsenals to the scene of the proposed destruction.

Then for hours the bursting, rending sounds of explosions filled the air. At 9 o'clock block after block of residences had been leveled to the ground, but the fire was eating closer and closer.

Then the explosives gave out. Even the powder in the government arsenals was exhausted long before noon. From that hour the flames raged practically unhindered.

Lieut. Charles C. Pulis, commanding the Twenty-fourth company of light artillery, was blown up by a charge of dynamite at Sixth and Jesse streets and fatally injured. He was taken to the military hospital at the Presidio. He suffered a fractured skull and several bones broken and internal injuries.

Lieut. Pulis placed a heavy charge of dynamite in a building on Sixth street. The fuse was imperfect and did not ignite the charge as soon as was expected. Pulis went to the building to relight it and the charge exploded while he was in the building.

The deceased officer was a graduate of the artillery school at Fortress Monroe, Va. He was 30 years of age.

The effectiveness of dynamite was proved on the fourth and last day of the conflagration, when the flames were finally checked by the use of that explosive.

Three heroes saved San Francisco—what was left of it. They were the dynamite squad that threw back the fire demon at Van Ness avenue.

When the burning city seemed doomed and the flames lit the sky further and further to the west, Admiral McCalla sent a trio of his most trusted men from Mare Island with orders to check the conflagration at any cost of life or property.

With them they brought a ton and a half of gun cotton. The terrific power of the explosion was equal to the maniac determination of the fire. Captain MacBride was in charge of the squad. Chief Gunner Adamson placed the charges, and the third gunner set them off.

The thunderous detonations to which the terrified city listened all that dreadful Friday night meant the salvation of 300,000 lives. A million dollars' worth of property, noble residences and worthless shacks alike were blown to drifting dust, but that destruction broke the fire and sent the raging flames over their own charred path.

The whole east side of Van Ness avenue, from Golden Gate to Greenwich, was dynamited a block deep, though most of the structures stood untouched by sparks or cinders. Not one charge failed. Not one building stood upon its foundations.

Every pound of gun cotton did its work, and though the ruins burned, it was but feebly. From Golden Gate avenue north the fire crossed the wide street in but one place. That was the Claus Spreckels place, on the corner of California street. There the flames were writhing up the walls before the dynamiters could reach it. The charge had to be placed so swiftly and the fuse lit in such a hurry that the explosion was not quite successful from the trained viewpoint of the gunners. But though the walls still stood, it was only an empty victory for the fire, as bare brick and smoking ruins are poor food for flames.

Captain MacBride's dynamiting squad realized that a stand was hopeless except on Van Ness avenue. They could have forced their explosive further in the burning section, but not a pound of gun cotton could be or was wasted. The ruined block that met the wide thoroughfare formed a trench through the

clustered structures that the conflagration, wild as it was, could not leap.

Engines pumping brine through Fort Madison from the bay completed the little work that the gun cotton had left, but for three days the haggard-eyed firemen guarded the flickering ruins.

The desolate waste straight through the heart of the city is a mute witness to the squad's effective work. Three men did this. They were ordered to save San Francisco. They obeyed orders, and Captain MacBride and his two gunners made history on that dreadful night.

CHAPTER XVII.

MISCELLANEOUS FACTS AND INCIDENTS.

Many Babies Born in Refuge Camps—Expressions of Sympathy from Foreign Nations—San Francisco's Famous Restaurants—Plight of Newspaper and Telegraph Offices.

IN the refugee camps a number of babies were born under the most distressing and pathetic circumstances, the mothers in many cases being unattended by either husbands or relatives. In Golden Gate Park alone fifteen babies were born in one night, it was reported. The excitement and agony of the situation brought the little ones prematurely into the world. And equally remarkable was the fact that when all danger was over all of the mothers and the children of the catastrophe were reported to have withstood the untoward conditions and continued to improve and grow strong as if the conditions which surrounded them had been normal. This, undoubtedly, was in great part due to the care and kindness of the physicians and surgeons in the camps whose efforts were untiring and self-sacrificing for all who had been so suddenly surrendered to their care.

In an express wagon bumping over the brick piles and broken streets was a mother who gave birth to triplets in the Panhandle of Golden Gate Park a week later. All the triplets were living and apparently doing well. In this narrow park strip where the triplets were born fifteen other babies came into the world on the same fateful night, and, strange as it seems, every one of the mothers and every one of the infants had been reported as doing well.

The following night thirteen more babies were born in the park Panhandle, and these, so far as the reports show, fared as well as those born the first night. In fact, the doctors and nurses reported that there had been no fatality among the earthquake babies or their unfortunate mothers. One trained nurse who accompanied a prominent doctor on his rounds the first night after the shock attended eight cases in which both mothers and children thrived. One baby was born in a wheelbarrow as the mother was being trundled to the park by her husband.

Expressions of sympathy and condolence on account of the great disaster were sent to the President of the United States from all over the world. Among the messages received within about 24 hours after the catastrophe were the following:

From the President of Guatemala—I am deeply grieved by the catastrophe at San Francico. The president of Guatemala sends to the people of the United States through your eminence his expression of the most sincere grief, with the confidence that in such a lamentable misfortune the indomitable spirit of your people will newly manifest itself—that spirit which, if great in prosperity, is equally great in time of trial.

President of Mexico—Will your excellency be so kind as to accept the expression of my profound and deep sympathy with the American people on account of the disaster at San Francisco, which has so affected the American people.

President of Brazil—I do myself the honor of sending to you the expression of the profound grief with which the government and people of the United States of Brazil have read the news of the great misfortune which has occurred at San Francisco.

Emperor of Japan—With assurances of the deepest and heartiest sympathy for the sufferers by the terrible earthquake.

King Leopold of Belgium—I must express to you the deep sympathy which I feel in the mourning which the terrible disaster at San Francisco is causing the whole American people.

President of Cuba—In the name of the government and people of Cuba, I assure you of the deep grief and sympathy with which they have heard of the great misfortune which has overtaken San Francisco.

Kirkpatrick, acting premier of New Zealand—South Australia deplores the appalling disaster which has befallen the state of California and extends heartfelt sympathy to sufferers.

Viceroy of India—My deepest sympathy with you and people of United States in terrible catastrophe at San Francisco.

Governor Talbot of Victoria, Australia—On behalf of the people of Victoria, I beg to offer our hearfelt sympathy with the United States on the terrible calamity at San Francisco.

President of Switzerland—The federal council is profoundly affected by the terrible catastrophe which has visited San Francisco and other California cities, and I beg you to receive the sincere expressions of its regret and the sympathy of the Swiss people as a whole, who join in the mourning of a sister republic.

Emperor Franz Joseph of Austria—I beg to assure you, Mr. President, of my most sincere sympathy with your land in its sorrow because of the terrible earthquake at San Francisco, and I beg to offer you personally, Mr. President, my heartfelt condolences.

Prince Henry of Prussia—Remembering American hospitality, which is still so fresh in my memory, I hereby wish to express my deepest sympathy on behalf of the terrible catastrophe which has befallen the thriving city of San Francisco and which has destroyed so many valuable lives therein. Still hope that news is greatly exaggerated.

Premier Bent of South Wales—New South Wales and Victoria sympathize with California suffering disaster.

Count Witte—The Russian members of the Portsmouth conference, profoundly moved by the sad tidings of the calamity that has befallen the American people, whose hospitality they recently enjoyed, beg your excellency to accept and to transmit to citizens

of United States the expression of their profound and heartfelt sympathy.

The cathedral of San Francisco with the residences attached, together with the residence of the archbishop, were saved. Sacred Heart College and Mercy Hospital, together with the various schools attached, were destroyed.

The churches damaged by the earthquake are:

St. Patrick's Seminary in Menlo park.

St. James' church.

St. Bridget's church.

St. Dominick's church.

Church of the Holy Cross.

St. Patrick's church at San Jose.

Those destroyed by fire were:

Churches of SS. Ignatius, Boniface, Joseph, Patrick, Brendan, Rose, Francis, Mission Dolores, French church, Slavonian church and the old Cathedral of St. Mary's.

The Custom House with its records was saved. It was in one of the little islands which the fire passed by. All the city records which were in the vaults of the city hall were saved. The city hall fell, but the ruins did not burn. By this bit of luck the city escapes great confusion in property claims and adjustments.

Millet's famous picture, "The Man with the Hoe," was saved with other paintings and tapestries in the collection of William H. Crocker.

Mr. Crocker, who was in New York, said about the rescue of the paintings (Head is Mr. Crocker's butler):

"I am much gratified at the devotion Head displayed in saving my pictures and tapestries at such a time. Besides the 'Man with the Hoe,' I have pictures by Tenniel, Troyon, Paul Potter, Corot, Monet, Renoir, Puvis de Chavannes, Pissaro, and Constable. The tapestries consisted of six Flemish pieces dating from the sixteenth century, of which the finest is a 'Resurrection.'

It is a splendid example of tissue d'or work, and was once the property of the duc d'Albe."

On April 20 Bishop Coadjutor Greer of the Protestant Episcopal church of New York announced that this prayer had been authorized to be used in the churches of that diocese for victims of the earthquake:

"O Father of Mercy and God of all comfort, our only help in time of need, look down from heaven, we humbly beseech thee, behold, visit and relieve thy servants to whom such great and grievous loss and suffering have come through the earthquake and the fire.

"In thy wisdom thou hast seen fit to visit them with trouble and to bring distress upon them. Remember, O Lord, in mercy and imbue their souls with patience under this affliction.

"Though they be perplexed and troubled on every side, save them from despair and suffer not their faith and trust in thee to fail.

"In this our hour of darkness, when thou hast made the earth to tremble and the mountains thereof to shake, be thou, O God, their refuge and their strength and their present help in trouble.

"And for as much as thou alone canst bring light out of darkness and good out of evil, let the light of thy loving countenance shine upon them through the cloud; let the angel of thy presence be with them in their sorrow, to comfort and support them, giving strength to the weak, courage to the faint and consolation to the dying.

"We ask it in the name of him who in all our afflictions is afflicted with us, thy son, our Saviour, Jesus Christ. Amen!"

Mrs. A. G. Pritchard, wife of a San Francisco manufacturer, who, with her husband, was on her way home from Europe to San Francisco, became suddenly insane at the Union Station in Pittsburg, Pa., when she alighted to get some fresh air.

The Pritchards were hurrying to San Francisco with the ex-

pectation of finding their three children dead in the ruins of their home.

Landing in New York April 24, the Pritchards learned that their home had been destroyed before any of the occupants had had an opportunity to get out.

Mr. Pritchard said that his information was that the governess was dying in a hospital, and from what he has heard, he had no hope of seeing his children alive.

At Philadelphia a physician told Mr. Pritchard that his wife was bordering on insanity. At the station Mrs. Pritchard shrieked and moaned until she was put into the car, where a physician passenger volunteered to care for the case.

On the afternoon of the fire the police broke open every saloon and corner grocery in the saved district and poured all malt and spirituous liquors into the gutters.

San Francisco was famous for the excellence of its restaurants. Many of these were known wherever the traveler discussed good living. Among them were the "Pup" and Marschand's in Stockton street; the "Poodle Dog," one of the most ornate distinctive restaurant buildings in the United States; Zinkand's and the Fiesta, in Market street; the famous Palace grill in the Palace hotel; and scores of bohemian resorts in the old part of San Francisco. They are no more.

Down near the railroad tracks at what used to be Townsend street, food was mined from the ruins as a result of a fortuitous discovery made by Ben Campbell, a negro. While in search of possible treasure he located the ruins of a grocery warehouse, which turned out to be a veritable oven of plenty. People gathered to this place and picked up oysters, canned asparagus, beans, and fruit all done to a turn and ready for serving.

For a time there was marked indignation in San Francisco caused by the report that the San Franciscans, in their deep-grounded prejudice, had discriminated against the Chinamen in the relief work. This report was groundless. The six Chinese

companies, or Tongs, representing enormous wealth, had done such good work that but little had been necessary from the general relief committee, and, besides, the Chinese needed less. No Chinaman was treated as other than a citizen entitled to all rights, which cannot be said under normal conditions on the Pacific coast. Gee Sing, a Chinese member of the Salvation Army, had been particularly efficient in caring for his countrymen.

The San Francisco daily newspapers, all of which were burned out, were prompt in getting in shape to serve their subscribers. On Thursday morning, the day after the fire, the best showing the morning journals could make was a small combination sheet bearing the unique heading, "Call-Chronicle-Examiner." It was set up and printed in the office of the Oakland Tribune, gave a brief account of the great disaster, and took an optimistic view of the future of the stricken city. The day after the papers, though still printed in Oakland, appeared under their own headings and with a few illustrations, showing scenes in the streets of San Francisco.

S. M. Pencovic, a San Francisco druggist, on arriving in Chicago from Paris, said he had a premonition of disaster, which impelled him to hasten home, several days before the earthquake. He left for San Francisco to search for his father and mother, who are among the missing.

"For several days I felt as if something awful was about to happen," said he. "So completely did the feeling take possession of me that I could not sleep at night. At last I could stand it no longer, and I left Paris April 14, four days before the upheaval.

"I embarked on La Savoie at Havre. I tried to send a wireless message, but could receive no answer.

"The day after the catastrophe the captain of the ship called me to his cabin and told me he had just received a wireless message that San Francisco had been destroyed by an earthquake. I was not surprised."

At the Presidio, where probably 50,000 people were camped, affairs were conducted with military precision. Here those who are fortunate enough to be numbered among the campers were able now and then to obtain a little water with which to moisten their parched lips, while rations, owing to the limited supply, were being dealt out in the smallest quantities that all may share a bit. The refugees stood patiently in line and the marvelous thing about it all was that not a murmur was heard. This characteristic is observable all over the city. The people were brave and patient and the wonderful order preserved by them had been of great assistance. Though homeless and starving they were facing the awful calamity with resigned fortitude."

In Oakland the day after the quake messages were stacked yards high in all the telegraph offices waiting to be sent throughout the world. Conditions warranted utter despair and panic, but through it all the people were trying to be brave and falter not.

Oakland temporarily took the place of San Francisco as the metropolis of the Pacific coast, and there the finance kings, the bankers and merchants of the San Francisco of yesterday were gathering and conferring and getting into shape the first plans for the rebuilding of the burned city and preventing a widespread financial panic that in the first part of the awful catastrophe seemed certain.

Resting on a brick pile in Howard street was a young Swedish woman, whose entire family had perished and who had succeeded in saving from the ruins of her home only the picture of her mother. This she clutched tightly as she struggled on to the ferry landing—the gateway to new hope for the refugees. A little farther along sat a man with his wife and child. He had had a good home and business. Wrapped in a newspaper he held six hand-painted dinner plates. They were all he could dig out of the debris of his home, and by accident they had escaped breakage.

"This is what I start life over again with," he said, and his wife tried to smile as she took her child's hand to continue the journey. Thousands of these instances are to be found.

Owing to the energetic efforts of General Funston and the officials of the Spring Valley Water Company the sufferers in all parts of the city were spared at least the horrors of a water famine. As soon as it was learned that some few mercenaries who were fortunate enough to have fresh water stored in tanks in manufacturing districts were selling it at 50 cents per glass, the authorities took prompt action and hastened their efforts to repair the mains that had been damaged by the earthquake shocks.

John Singleton, a Los Angeles millionaire, his wife and her sister, were staying at the Palace Hotel when the earthquake shock occurred.

Mr. Singleton gave the following account of his experience: "The shock wrecked the rooms in which we were sleeping. We managed to get our clothes on and get out immediately. We had been at the hotel only two days and left probably $3,000 worth of personal effects in the room.

"After leaving the Palace we secured an express wagon for $25 to take us to the Casino near Golden Gate Park, where we stayed Wednesday night. On Thursday morning we managed to get a conveyance at enormous cost and spent the entire day in getting to the Palace. We paid $1 apiece for eggs and $2 for a loaf of bread. On these and a little ham we had to be satisfied."

John A. Floyd, a Pullman conductor on the Northwestern railroad, living in Chicago, gave a lengthy and vivid description of the quake and its effects.

"If I live a thousand lifetimes I will never forget that night," he said. "Words are too feeble, entirely too inadequate, to portray the fear that clutched the human breast. The most graphic pen could not faithfully portray the sickening horror of that night.

"Plaster falling from the walls in my room in the fourth floor

RUINS OF POODLE DOG RESTAURANT. This was one of the most famous restaurants in the world, as no tourist was satisfied until he had visited it. The above picture shows how complete was the destruction wrought by the fire.

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RUINS OF BUSINESS DISTRICT. This picture shows how completely the disaster leveled many buildings. The James Flood building on the left and Hamilton Hotel on the right were not destroyed.

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of the Terminal Hotel in Market street aroused me from a sound sleep about 5 o'clock in the morning. I sat up in bed, and got out onto the floor. The building was shaking like a reed in a storm, literally rocking like a hammock. It was impossible for me to stand. Another shock threw me heavily to the floor. I remained there for what seemed hours to me. Then I crawled on hands and knees to the door, and succeeded in unlocking it with much difficulty. I was in my night clothes, and without waiting to even pull on a pair of shoes I made my way down those swaying stairs as rapidly as I could.

"When I reached the street it was filled with half mad unclothed men, women, and children, running this way and that, hugging and fighting each other in their frenzy.

"The loud detonations under the earth enhanced the horror. The ground kept swaying from side to side, then roaring like the waves of the ocean, then jolting in every conceivable direction.

"Buildings were parting on all sides like egg shells, the stone and brick and iron raining down on the undressed hundreds in the streets, killing many of them outright and pinning others down to die slowly of torture or be roasted alive by the flames that sprang up everywhere around us.

"When things had quieted somewhat, I went back to the hotel to dress, and discovered that the entire wall of my room had fallen out.

"I succeeded in finding most of my clothes, and after donning them hastily went back to the work of rescue. When I got back to the street from the hotel the entire district seemed to be in flames. Fire seemed to break out of the very earth on all sides of Market street, eating up buildings as if they were so many buildings of paper. A big wholesale drug house on Seventh street exploded, throwing sparking and burning embers high into the air. These fiery pieces descended on the half-clad people in the streets, causing them to run madly for places of safety, almost crazy with the pain.

"Soon the improvised hearses began to arrive. Out of every building bodies were taken like carcasses out of a slaughter pen. Automobiles, carriages, express wagons, private equipages, and vehicles of all kinds were pressed into service and piled high with the bodies. Everywhere these wagon loads of dead bodies were being dragged through the streets, offering a spectacle to turn the most stout-hearted sick.

"With three or four sailors I went up to Seventh street to assist a number of men, women and children who had become entombed under the debris of a flat building.

"They were so tightly wedged in that we were unable to offer them any help and had to stand by and hear their cries as they were slowly roasted to death by the ever increasing flames. I can hear the cries of one of those women ringing in my ears yet—I guess I always will.

"I guess pretty nearly every bone in her body was broken. As we stood by helplessly she cried over and over again:

" 'Don't let me die like this. Don't let me roast. I'm cooking, cooking alive. Kill me! Shoot me—anything! For God's sake have mercy!'

"Others joined her in the cry and begged piteously to be quickly killed before the flames reached them.

"By this time the street level had become so irregular that it was almost impossible to drag the dead wagons over them.

"Dynamite was then brought into use and the buildings were blown up like firecrackers. Flying debris was everywhere in the air, and another mad rush for safety was made, the almost naked people falling over each other in their frantic efforts to get out of the danger.

"While this excitement was at its height a man dressed only in his underclothing made his appearance among the people in a light gasoline runabout. At top speed he ran into a crowd of women, knocking them down and injuring at least a dozen.

Then he turned back and charged them again. He had gone mad as a result of the scenes of death and destruction.

"Some one called for a gun, hoping that they might stop the fellow by shooting him. None was to be had, and after a desperate fight with sailors who succeeded in getting into the machine he was overpowered and turned loose.

"Everybody in the crowd, I believe, was temporarily crazy. Men and women ran helter-skelter in nothing but their night gowns, and many of them did not have on that much."

Mrs. J. B. Conaty, of Los Angeles, was in Oakland at the time of the shock and felt the vibrations. "The suddenness with which it came upon the people," she said, "was the most appalling thing. When I looked across the bay at 'Frisco from the Oakland shore the city seemed peacefully at sleep, like a tired baby beside its mother. With my next glance at the city I was turned almost sick.

"The ground was shaking beneath me and I thought that the end of the world was at hand. Buildings were falling to the right and left. The earth was groaning and rocking, and flames were shooting high into the sky. Soon the sound of the dynamiting reached us and buildings began to fly in the air like fireworks.

"The sea lashed itself into a fury and beat upon the shores as if it too sought to escape nature's wrath. Over across the bay all was disorder. In the glare of the blood red flames reflected against sky and sea, white robed, half naked men and women could be seen wildly running about.

"Some of them ran to the water's edge and threw themselves in and others less frantic had to battle with them to haul them out.

"It seemed as if every man, woman and child in 'Frisco was running toward the ferry docks. When the boat arrived on our side of the shore it was packed with men and women, none of whom seemed to be in their right senses. Many of them jumped from the boat as soon as it was made fast and ran at top speed

through the streets of Oakland until forced to fall through sheer exhaustion.

"One woman in the crowd had nothing on but a night gown. In her arms she carried a 3-year-old girl who was hanging tightly to a rag doll and seemed to be the only one in the vast crowd that was unafraid. Where all these people went to I have no idea.

"I stood on the Oakland side watching 'Frisco devoured. In a space of time so short that it all seems to me like a dream now the whole city, slumbering peacefully but a moment before, presented a perdition beside which Dante's inferno seems to pale into insignificance."

The looters early began operations in the stricken city. The vandal thinking that law and order had gone in the general crash filled his pockets as he fled.

It was the relic hunter who opened the door to the looter. The spirit which sends the tourist tapping about the ruins of the Parthenon, awoke in San Francisco. Idle and curious men swarmed into the city, poking about in the ruins in the hope of finding something worth carrying away as a souvenir of the greatest calamity of modern times.

Scores of men and women were seen digging in the ruins of one store. They were disinterring bits of crockery, china and glassware. Strangely enough, a great deal of this sort of ware had been protected by a wall which stood through quake and fire. One woman came toiling out over a pile of brick, covered with ashes and dust, her hair dishevelled and hands grimy, but she was perfectly happy.

"See," said she, "I found half a dozen cups and saucers as good as new. They are fine china and they will be worth more than ever now."

I asked her if she needed them.

"Oh, dear no!" said she, laughing. "I live over in Oakland. I just wanted them to keep as souvenirs!"

Some hard-hearted jokers were abroad also. Humor dies

hard, and perhaps it is just as well that it does, for the six men who started the bogus bread lines would have needed much of it if the soldiers had caught them.

The people of San Francisco had become accustomed to eating out of the hand. They put in long hours every day standing in line waiting for something to be given out. Many of them did not know what was being distributed, but they knew it would be good, so they fell into line and waited.

There were thousands of people in San Francisco who fell into a line every time they saw one. They had the bread line habit.

This impressed itself on these six men, for they went about the town and every time they found a promising spot they lined up and looked expectant. Men came and fell in behind. Women with baskets joined the brigade and in ten minutes these sidewalk comedians had a string a block long behind them and more coming every minute. Then the six jokers slipped away and left the confiding ones to wait. It was a mean trick.

The stranger and the wayfarer was made to feel at home anywhere in Oakland and the luxury of sleeping within four walls was not denied to any one. Only a few hardy men who were willing to sacrifice themselves for the good of the weaklings went without covering. The people stripped the portieres and hangings from their walls, tore up their carpets and brought in every spare piece of cloth which would do for a night's covering. The women and children who preferred to stay indoors and on hard floors were taken care of in the public halls, the school buildings, and the basements of the churches. Beds were improvised of sheets and hay and the weaker refugees, who were beginning to go down under the strain, slept comfortably. Oakland did nobly. People shared their beds with absolute strangers, and while the newcomers in the park camps were dead to the world, those who came the day before cheered up considerably. One camp of young men got out a banjo and sang for the entertainment of the crowd.

CHAPTER XVIII.

DISASTER AS VIEWED BY SCIENTISTS.

Scientists are Divided Upon the Theories Concerning the Shock That Wrought Havoc in the Golden Gate City—May Have Originated Miles Under the Ocean — Growth of the Sierra Madre Mountains May Have Been the Cause.

THE subterranean movement that caused the earthquake at San Francisco was felt in greater or less degree at many distant places on the earth's surface. The scientists in the government bureaus at Washington believe that the subterranean land slide may have taken place in the earthquake belt in the South American region or under the bed of the Pacific Ocean. San Francisco got the result of the wave as it struck the continent, and almost simultaneously the instruments in Washington reported a decided tremor of the earth, and the oscillations of the needle continued until about noon.

At the weather bureau the needle was taken from the pivot and had to be replaced before the record could be continued. Other government stations throughout the country also noted the earthquake shock, and they agree in a general way that the disturbance began according to the record of the seismograph at nineteen minutes and twenty seconds after 8 o'clock. This would be the same number of minutes and seconds after 5 o'clock at San Francisco, which accords entirely with the time of the disaster on the Pacific Coast.

There seems to be no reason to believe the earthquake shock in San Francisco had any direct connection with the eruption of Vesuvius. That eruption had been recorded from day to day

on the delicate instruments established by the weather bureau at the lofty station on Mount Weather, high up in the Virginia hills. This eruption of Vesuvius did not disturb the seismograph even at the period of great activity, but apparently Vesuvius and Mount Weather were like the lofty poles of two wireless telegraph stations, and between them there passed electrical magnetic waves encircling the earth. The records made at Mount Weather were of the most distinct character, but they showed disturbances in the air of a magnetic type and did not indicate any earthquake.

In explaining the San Francisco trembling, C. W. Hays, the director of geology in the geological survey, explained that earthquakes are, according to modern scientific theory, caused by subterranean land slides, the result of a readjustment as between the solid and the molten parts of the earth's interior.

"The earth," he said, "is in a condition of unstable equilibrium so far as its insides are concerned. The outer crust is solid, but after you get down sixty or seventy miles the rocks are nearly in a fluid condition owing to great pressure upon them. They flow to adjust themselves to changed conditions, but as the crust cools it condenses, hardens, and cracks, and occasionally the tremendous energy inside is manifested on the surface.

"When the semi-fluid rocks in the interior change their position there is a readjustment of the surface like the breaking up of ice in a river, and the grinding causes the earthquake shocks which are familiar in various parts of the world. The earthquake at San Francisco was probably local, although the center of the disturbance may have been thousands of miles away from that city."

Prof. Willis L. Moore, the chief of the weather bureau, in talking of the records of the earthquake in his department, said:

"We have a perfect record of this earthquake, although we are thousands of miles away from the actual tremor itself. There were premonitory tremblings, which began at 8:19 and continued

until 8:23 or thereabout. Then there was severe shock which threw the pen off the cylinder.

"According to our observations here there was a to and fro motion of the earth in the vicinity of Washington amounting to about four-tenths of an inch at the time of its greatest oscillation. These movements kept up in a constantly decreasing ratio until nearly half an hour after noon.

"San Francisco may have been a long way away from the real earthquake and merely have been within the radius of severe action so as to produce disastrous results. It is quite likely, in fact, that the greatest disturbance may have taken place beneath the bed of the Pacific Ocean.

"If it resulted in an oscillation of the earth of only a few inches there would be no likelihood of a great tidal wave. If, however, there was produced a radical depression in the bed of the ocean, the sinking of an island, or some other extraordinary disturbance, a tidal wave along the Pacific Coast would almost certainly be one of the events of this great disaster.

"There are apparently three distinct weak spots in the United States, which are peculiarly subject to earthquake shocks, and we are likely sooner or later to hear from all of them in connection with the shock at San Francisco. There is one weak area along the southern Atlantic coast in the vicinity of Charleston, another is in Missouri, and the third includes the Pacific Coast from a point north of San Francisco down to and beyond San Diego."

In describing the instruments at the weather bureau which make the record of earthquakes, even when the movement is so small that the ordinary person does not recognize it, Prof. Moore said:

"The apparatus we have is a pen drawing a continuous line on a cylinder which revolves once every hour and is worked continuously by clockwork in an exact record of time. It moves in a straight line when there is no disturbance, and it jumps from right to left and back again when there are serious oscillations

of the earth. The extent of these movements of the pen measures the grade of the oscillation. You may think it is a fantastic statement, but this seismographic pen is adjusted so delicately that it will register your step in its vicinity.

"The instrument is mounted on a solid stone foundation and what it registers is the effect of your weight pressing upon the earth. It is easy to see, therefore, that the record we have obtained of this earthquake shows a few preliminary tremblings, which seem to be premonitions, for about four minutes, then a great crash which threw the pen off the cylinder and finally a period of nearly four hours, during which there were slight tremblings of the earth, this latter period marking the readjustment after the actual shock."

Most of the scientists were inclined to believe that the boiling process in the interior of the earth, although it goes on continuously, is subject to periods of greater or less activity. This activity may be, however, purely local, according to the scientific theory, for otherwise there would be eruptions in all the active volcanoes of the earth at the same time, and there would be earthquakes in every one of the areas where there is liability to seismic disturbances.

One government scientist in discussing the San Francisco earthquake said: "If we could have been right here in the vicinity of Washington a few hundreds of thousands of millions of years ago, we should have seen earthquakes that were earthquakes. The Alleghanies were broken up by great convulsions of the earth, and it is probable that this North American continent of ours was rocked a foot or two at a time, causing a tremendous crash of matter and the reorganization of the world itself.

"The crust, while not necessarily thinner, is not so solid. In cooling it has cracked and left fissures or caverns or jumbled strata of softer material between harder rocks, so that it is peculiarly subject to earthquakes."

Maj. Clarence E. Dutton, U. S. A., retired, the most famous

American expert on seismic disturbances, said it was probably the greatest earthquake that has occurred in this country since 1868. He declared that it undoubtedly would be followed by disturbances of less intensity in the same quarter. He stated most emphatically that the eruption of Vesuvius had no bearing whatsoever on the disturbance on the Pacific Coast.

J. Paul Goode, a professor in geology in the University of Chicago, attributes the cause of the Frisco earthquake to the Sierra Madre mountains, but not in a volcanic way, for he also claims that lava had nothing to do with the California shock. The shocks, he showed, can be attributed to mountains without volcanoes in their midst. The Sierra Madres are growing, he said, and for this reason they have shaken the city of San Francisco. He says that the gradual growing of mountains causes the underlying blocks of the earth's crust to slip up and down and shape the top of the earth in their vicinity when they fall any great distance.

His ideas upon the subject are: "I figure that the earthquake which caused so much damage in San Francisco came from what we call the focus of disturbance. This focus at San Francisco is seven miles below the surface of the earth. As the Sierra Madre mountains grow, a phenomenon which is constantly going on, the blocks of earth below change positions; as a large block falls a series of shocks travels, up and down much the same way as the rings in the water travel out from the point at which a pebble strikes. When the vibration reaches the surface crust a severe shaking of the country adjacent is the result.

"From the actions of the earth in April of 1892, when such a severe shock was felt in San Francisco, I have no doubt but that a second earthquake will follow closely upon the one of yesterday, as the second followed the first in 1892. In that year the first came upon the 19th of April and the second upon the 21st."

Of 948 earthquake shocks that have been recorded in California previous to 1887, 417 were most active in San Francisco.

The seismographs which record the merest tremors and determine the place of the shock show that 344 have occurred since 1888. Half of the sum total have occurred in the vicinity of the gate city and for this reason it is believed that the severe shock of April 18 was the final fall of a crust of the earth which has been gradually slipping for centuries, causing from time to time the slight shocks.

The seismic physics of San Francisco and its immediate neighborhood have engaged the careful study of physical geographers. The commonly accepted opinion is one which was formulated by Prof. John La Conte, professor of geology in the University of California, and one of the world's geological authorities. His explanation is based upon the mountain contours of the coast of California from the Santa Barbara channel northward to the Golden Gate. In this region are represented two peninsulas, one visible, the other to be discovered through examination of the altitudes upon the map corresponding to existing geological features. This second and greater peninsula comprises the Monte Diablo and Coast ranges, separated from the Sierra elevation by the alluvial soil of the low-lying valley of the San Joaquin. This valley is contoured by the level of 100 feet and lower for a considerable portion of its length, and practically all of it lies below the level of 500 feet. The partition thereby accomplished between the Sierra mountain mass and the coastal mountains is sufficiently pronounced to indicate what was at no remote period an extensive peninsula.

This valley of the San Joaquin lies above the line of a geological fault, at a depth which can only be estimated as somewhere about a mile. The artesian well borings which have been abundantly prosecuted in the counties of Merced, Fresno, Kings and Kern afford evidence looking toward such a determination of bedrock depth. On the ocean side the continental shelf is extremely narrow. The great peninsula presents a most precipi-

tous aspect toward the ocean basin. It is interrupted at intervals by deep submarine gorges extending close to the shore.

The oceanic basin of the Pacific is throughout a region of volcanic upheaval and seismic disturbance.

Conditioned on the one side by the known fault of the San Joaquin Valley and on the other by the volcanic activity of the Pacific basin, the greater peninsula of San Francisco in particular has always been subject, so far as the memory of white settlers can go, to frequent shocks of earthquake. In the last score or more of years seismographic observatories have been maintained at several points about San Francisco bay, and the records have been sufficiently studied to afford data for comprehension of the varied earth waves which have made themselves felt either to the perception of the citizens of the Golden Gate or to the sensitive instruments. Such observations have been conducted by Prof. George Davidson, for many years in charge of the Coast and Geodetic Survey upon the Pacific Coast; by Prof. Charles Burckhalter, of the Chabot Observatory, in Oakland, and by the staff of the Lick Observatory on Mount Hamilton.

Careful inspection of these records shows that two systems of earthquake disturbances act upon San Francisco. Those of the lighter series show a wave movement beginning in one of the easterly quadrants and more commonly in the southeastern. This series of light shocks is attributed to the slip along the line of the San Joaquin fault. While they may occur at any season of the year, they are more frequently observed when the San Joaquin river is running bank high under the influence of the melting snows in the foothills of the Sierra. That such a condition has recently existed is made clear by the report within less than a month of floods in the interior valleys of the State. Assuming, as the geologists do, that the fault in the valley lies near the roots of the Monte Diablo range, on the western edge of the alluvial plain, it will be seen that the physical factors involving the slip are very simple. There is a wide, flat plain bounded on the

west by a line of weakness in the rock supports. When this plain is carrying an abnormal weight of water the tendency is to break downward at the line of the fault. This tendency will produce a jar in the mountain mass which will be rapidly communicated to its farthest extremity.

The earthquakes which have their origin in the disturbances to which the oceanic basin is subject always approach San Francisco from the direction of the southwest quadrant. These have been uniformly more violent than those whose origin is attributed to the San Joaquin fault. While the records of San Francisco earthquakes up to the present have exhibited a mild type, the damage to property having hitherto been slight, it would appear from the extent and violence of the present temblor that both causes had for once united.

The possibility of such simultaneous action of the two known seismic factors of the greater peninsula had been foreseen by Prof. Le Conte. He stated that if at any time an earthquake wave of only moderate violence should come in from the oceanic basin in sufficient strength to jar the coastal mountain masses at a period when the San Joaquin Valley was bearing its maximum weight of water the conditions would be ripe for simultaneous shocks from the southwest and from the southeast. In such a condition, while neither of the shocks by itself would be capable of doing any great amount of damage to buildings in San Francisco, the combination of two distinct sets of waves might prove too much for any work of man to withstand.

In spite of the declarations of some scientists that there can be no possible connection between the eruption of Mount Vesuvius and the earthquake of San Francisco, others are inclined to view certain facts in regard to recent seismic and volcanic activity as, to say the least, suggestive.

There is one very remarkable circumstance in regard to all this activity. All the places mentioned—Formosa, Southern Italy, Caucasia and the Canary Islands—lie within a belt bounded by

lines a little north of the fortieth parallel and a little south of the thirtieth parallel. San Francisco is just south of the fortieth parallel, while Naples is just north of it. The latitude of Calabria, where the terrible earthquakes occurred last year, is the same as that of the territory affected by yesterday's earthquake in the United States.

There is another coincidence, which may be only a coincidence, but which is also suggestive. The last previous great eruption of Vesuvius was in 1872, and the same year saw the last previous earthquake in California which caused loss of life.

Camille Flammarion expressed the opinion that the earthquake at San Francisco and the eruption at Vesuvius are directly connected. He also sees a connection between the renewed activity of Popocateptl, Mexico's well-known volcano, and the disturbance on the Western coast. He says that, though the surface of the earth is apparently calm, "there is no real equilibrium in the strata of the earth," and that the extreme lateral pressure which is still forming mountains and volcanoes along the Western coast brought about an explosion of gases and the movement of superheated steam several miles below San Francisco, resulting in an earthquake.

Another theory is that the earth in revolving is flattening at the poles and swelling at the equator, and the strata beneath the surface are shifting and sliding in an effort to accommodate themselves to the new position. Other scientists scout this idea, saying that earthquakes are not caused by the adjustment of the surface of the earth, but by jar and strain as the earth makes an effort to regain its true axis.

As regards the possible connection between volcanoes and earthquakes, it is known that a violent earthquake, whose shocks lasted several days, accompanied the eruption of Vesuvius in the year 79, when Pompeii and Herculaneum were destroyed. In 1755 thousands upon thousands of people lost their lives in the memorable earthquake at Lisbon, in Portugal. At the same time

the warm springs of Teplitz, Bohemia, disappeared, later spouting forth again. In the same year an Iceland volcano broke forth, followed by an uprising and subsidence of the water of Loch Lomond in Scotland. The eruption of Vesuvius in 1872 was followed soon after by a serious earthquake in California.

Coming to the present year, it is noticed that the earthquake in the island of Formosa, in which 1,000 people lost their lives, was followed by the eruption of Vesuvius on April 8. Soon after came the second great shock in Formosa, in which there was an even greater loss of life.

Later there were two earthquake shocks in Caucasia. At the same time the news of this appeared there was a report of renewed activity on the part of a volcano in the Canary Isles, which had long been dormant. In the United States two volcanoes which have been regarded as extinct for more than a century—Mount Tacoma and Mount Rainier—began to emit smoke. In regard to Tacoma, Dr. W. J. Holland, head of the Carnegie Institute at Pittsburg, says: "There is no doubt that there has been a breakdown and shifting of strata, perhaps at a very great depth, in the region of San Francisco. There certainly is great connection between this earthquake and recent private reports which have come to me of intense volcanic activity on the part of Mount Tacoma."

On the other hand, leading scientists contend that these instances are mere coincidences. "If there is any connection between Vesuvius and the Caucasus and Canary Isles earthquakes other places would have suffered too; New York, for instance, is on the same parallel," says Prof. J. F. Kemp, of Columbia University.

Although each of these scientists has the most absolute faith in his theory, he really knows no more about the facts than any boy on the street. No one has ever descended into the interior of the earth and investigated the heart of a volcano but Jules Verne, and he only in his mind. What is needed now is exact

information. The San Francisco catastrophe will teach many lessons, and among them the necessity for the close study of both volcanoes and earthquakes. There is no reason why earthquakes and other internal disturbances cannot be observed just as closely as the weather. In fact, it is entirely probable that the time will come when a seismological bureau will exist for the study of earthquakes, just as there is a Weather Bureau for observation of the weather, and it will be the business of its officials to prophesy and warn of approaching internal disturbances of the earth, just as the weather men announce the approach of bad weather. Government observation stations will be established, exact records will be kept, and in the course of time we shall learn exactly what earthquakes are and what are their causes.

Among other lessons that the disaster has taught is that the much-maligned skyscraper is about the safest building there is. Its steel-cage structure, with steel rods binding the stone to its wall, has stood the test and has not been found wanting. Of all the mighty buildings in San Francisco those of the most modern structure alone survived. Their safety in the midst of collapsing buildings of mortar and brick argues well for like structures in other cities.

Mr. Otis Ashmore declared that the regions lying along the Pacific coast contain several of the moving strata which cause earthquakes. He said:

"While much concerning the origin of earthquakes is still a matter of doubt in the minds of scientific men, it is now generally conceded that the real cause is the sudden slipping and readjustment of the strata of rocks with the crest of the earth. As the earth is slowly cooling a very slow contraction of the earth's crust is constantly going on, and as this crust consists very largely of stratified layers of rock, the enormous forces arising from this contraction are resisted by the solid rock.

"Notwithstanding the apparent irresistible nature of these layers of rock, they slowly yield to the enormous lateral pressure

REFUGEE CAMP NEAR GAS WORKS. The destruction of the residence districts rendered about 300,000 persons homeless, and temporary quarters were erected in the parks and other available places, where each family collected the few household effects saved from the fire. The above photograph shows a typical "home" after the fire.

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HOUSEHOLD GOODS ABANDONED. When the residence districts were first attacked by fire, the people removed what goods they could to small parks, but these later were destroyed by the fire. The above shows trunks, pianos, bedding and other furniture abandoned by the owners as the fire drove them away.

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of contraction and gradually huge folds are pushed up in long mountain ranges. Usually this process goes on so slowly and gradually that the yielding of the rock masses takes place without noticeable jar, but occasionally a sudden slip occurs under the gigantic forces, and an earthquake is the result. This slip is usually only a few inches, but when two continents fall together for only a few inches enormous energy is developed.

"Such slips usually occur along the line of an old fissure previously formed, and the depth below the surface of the earth varies from one to twelve miles. Thus places situated near these old internal fissures are more likely to experience earthquakes than those farther away. It is a well known geological fact that the Pacific coast in California contains several of these fissures and earthquakes are more common there. The entire western part of the United States has been slowly rising for many centuries, and the shifting of soil due to erosion and transportation doubtless contributes to produce these seismic disturbances.

"Earthquakes are more common than most persons think. Modern instruments for detecting slight tremors within the earth's crust show that there is scarcely an hour in the day free from these shocks. In mountain regions, and especially in the highest and youngest mountains, erosion is most rapid, and on the sea bottom, along the margin of the continents sedimentation is greatest. In these regions, therefore subterranean temperature and pressure changes are most rapid and earthquakes most frequent.

"A study of earthquakes develop these general facts. The origin is seldom more than twelve miles below the surface; the size of the shaken region bears a certain relation to the depth of the origin or focus, the smaller shaken region indicating a relatively shallow origin; the energy of the shock is approximately indicated by the area of the shaken region; the origin is seldom a point, but generally a line many miles in length; the subterranean stress is not relieved by a single movement, but rather by a quick succession of movements causing a series of jars.

"The transmission of an earthquake shock through the earth takes place with wonderful rapidity. The elastic wave varies in velocity from 800 to 1,000 feet per second in sand or clay to three miles per second in solid granite.

"Sometimes these vibrations are of such a character as to be imparted to the air, and their transmission through the air outstrips the transmission through the earth and the ear detects the low rumbling sounds before the shock is felt.

"If the origin of the shock is under the sea near the coast any upheaval of the bottom of the ocean that frequently accompanies an earthquake, gives rise to a great tidal wave that frequently inundates the neighboring coast with much damage.

"While the phenomena of earthquakes and volcanoes are usually associated in the same region, one cannot fairly be said to be the cause of the other. Both are rather effects of a common cause, or rather of common causes, the chief of which is the shrinking and readjustment of the rocky strata within the earth. The suggestion that there is some physical connection between the recent eruptions of Vesuvius and the earthquake at San Francisco does not accord with the generally accepted views of geologists concerning these phenomena.

"It is probably true that a critical condition of stress between two gigantic and contending forces may be touched off, as it were, by any feeble force originating at a distance. Thus a distant volcanic eruption or earthquake shock may determine the climax of stress in a given portion of the earth, which will produce an earthquake. Observations show that more earthquakes occur near the full and the new moon than at other times. This is probably due to the fact that at these times the gravitation of the sun and moon are combined, and their effect upon the earth is greater. We can see this effect in the higher tides at new and full moon. But these forces, it will be seen, are the occasions, and not the causes of earthquakes.

"The probable recurrence of the San Francisco earthquake is

a matter of great uncertainty. In general, whenever the internal stress of the forces that give rise to earthquakes is relieved there is usually a long period of quiescence in the strata of the earth, but in the course of time, especially in regions of recent and rapid geological changes, such as is the case on the Pacific coast, there is almost certain to be recurrences of earthquake shocks from time to time.

"The geological forces may, however, gradually adjust themselves, and it may be many centuries before such a dynamic crisis will arise as that which has just convulsed a continent."

California has had a number of great earthquakes. The records go back to the earthquake at Santa Ana in 1769. Not very much is known of this earthquake, though a church was built there and dedicated as Jesus de los Temblres.

Another one occurred at Santa Barbara in 1806, and still another in 1812. The Old Mission, about the only building there at that time, on both occasions practically had to be rebuilt.

Hittell's History of California says that "slight shocks of earthquakes are not infrequent, but none of really violent or dangerous character has been known to occur. An old or badly constructed building has occasionally been thrown down, and a few people have been killed by falling roofs or walls. But there has been nothing in the experience of the oldest inhabitants to occasion or justify fear or dread. The first one of which there is any full record occurred on October 11, 1800, and consisted of six consecutive shocks, and it tumbled down the habitations of San Juan Bautista.

"The most disastrous shock occurred in December, 1812, when the church of San Juan Capistrano was thrown down and forty Indians killed by its fall. The same shock extended northwestward and damaged the churches of San Gabriel, San Buenaventura, Santa Barbara, Santa Inez and Purisima. In 1818 the church of Santa Clara was damaged, and in 1830 the church of San Luis Obispo."

CHAPTER XIX.

CHINATOWN, A PLAGUE SPOT BLOTTED OUT.

An Oriental Hell within an American City—Foreign in its Stores, Gambling Dens and Inhabitants—The Mecca of all San Francisco Sight Seers—Secret Passages, Opium Joints and Slave Trade its Chief Features.

TO a visitor unacquainted with oriental customs and manners the most picturesque and mysterious spot in the region of the Golden Gate was Chinatown, now blotted out, which laid in the heart of San Francisco, halfway up the hillside from the bay and was two blocks wide by two blocks long. In this circumscribed area an Oriental city within an American city, more than 24,000 Chinese lived, one-half of whom ate and slept below the level of the streets. The buildings they occupied were among the finest that were built in the early days of the gold fever. What was at one time the leading hotel of the city was as full of Chinese as a hive is full of bees, for they crowd in together in much the same way. As the gold fever attracted the Chinese to the Pacific coast, San Francisco was made a headquarters and the Orientals soon established themselves in a building on the side hill. As they continued to swarm over, gradually the American tenants were crowded out until a certain section was set apart for the Chinese residents and Chinatown became as distinct a section of the city as the Bowery in New York used to be, "where they do such things and say such things." The time to see Chinatown was after dark, from ten at night to four in the morning, and a day and a night spent in the district would give you a very fair idea of Chinatown as it was.

The streets were narrow and steep, paved with rough cobblestone. The fronts of the buildings had been changed to conform with the Chinese idea of architecture. Wide balconies and gratings and fretwork of iron painted in gaudy colors gave an Oriental touch. The fronts were a riot of color. The fronts of the joss houses and the restaurants were brightened with many colored lanterns, quaint carved gilded woodwork, potted plants and dwarf trees. Up and down these narrow streets every hour in the twenty-four you could hear the gentle tattoo, for he seemed never to sleep, never to be in a hurry and always moving. Stop on any corner five minutes and the sight was like a moving picture show. It was hard to make yourself believe that you were not in China, for as near as is possible Chinatown had been converted into a typical Chinese community. You heard no other language spoken on the streets or in the stores except by tourists, "seeing the sights." Chinese characters adorned the windows and store fronts, the merchants in the stores were reading Chinese newspapers, the children playing on the streets jabbered in an unknown tongue, and every man you met had a pigtail hanging down his back. The streets were full of people, but there were no crowds and neither in the day nor night could you see a drunken Chinaman.

The first floor of nearly every building in Chinatown was occupied by a store or market. Most of the goods sold were imported from China. In every store there was but one clerk who could talk fair English but the bookkeeping was done in Chinese and money was counted in Chinese fashion. In the botanic stores dried snakes and toads were sold for use in compounding potions to drive away evil spirits and baskets of ginseng roots were displayed in the windows. The clothing stores handled Chinese goods exclusively and in the shoe stores beautifully embroidered sandals with felt soles an inch thick were sold for a dollar a pair. Occasionally in one of the jewelry stores a workman welded a solid gold bracelet to the arm of a Chinaman,

who, afraid of being robbed of his gold, had it made into a bracelet and welded to his wrist. In the markets you found an endless display of fish, poultry and vegetables. The chickens were sold alive. The dried fish came from China. All the vegetables sold in Chinatown were raised in gardens on the outskirts of the city from seed sent over from China and some of the specimens were odd looking enough. The Chinese vegetables thrive better in the soil of California than in China and Chinese vegetables raised in the San Francisco district were sent to all the mining camps in the Rockies and as far away as Denver. Some of the Chinese squashes are four feet long. Everything that can be imported from China at a profit was shipped over and the rule among the Chinese was to trade as little as possible with foreigners.

The Chinaman is thrifty and if it were not for gambling and one or two other vices they would all be rich, for they are industrious.

The Chinaman does not go much on strong drink and in many ways is a good citizen, but he does love to smoke opium and to gamble. It was easy to gain access to an opium den if you had a guide with you. The guides, many of whom are Chinese, speak English, and the English guides speak Chinese. The guides got a dollar apiece from the party of visitors they piloted about and a percentage from all moneys spent by the party in the stores, saloons, restaurants, theaters and the dives. In return they paid for the opium that was smoked in the dens for the edification of the visitors and dropped a tip here and there as they went from place to place. Most of the opium dens were underground.

The majority of the people of Chinatown lived in what were little better than rat holes, dark, poorly ventilated little cells on the side of narrow passages in basements. The rich merchants and importers lived well, but the middle and poorer classes lived in the basements where rent was cheap. Of the 24,000 Chinese population only about 900 were women so Chinatown was a bachelor's town by a large majority, though some of the residents had

wives in China to whom they expected to return some day. The rule in the basements was for ten men to sleep in a room six by ten feet and do their cooking over a little charcoal fire in one corner of the room. The beds they slept in were simply bunks. The population of Chinatown had somewhat decreased since the Exclusion act was passed. Few Chinamen came over and many, having saved up a little fortune, had gone back to China to stay. Of the entire population of Chinatown there were about 1,000 who voted; they constituted the native born element. The men and women dress much alike.

One of the sights which the inquisitive traveller to the Pacific coast rarely missed was the Chinese theater. Entrance was gained through the rear from an alley by the payment of 50 cents for a ticket. After walking down a narrow passageway, climbing up two flights of stairs and down three ladders one reached the green room in the rear of the stage where one saw the actors in all the glory of Oriental costume. No foreigners, as Americans were regarded, were allowed in any part of the theater except on the stage where half a dozen chairs were reserved on one side for visitors who came in the back way. There was no drop curtain in front of the stage and the orchestra was located in the rear of the stage. The orchestra would attract attention anywhere. The music was a cross between the noise made by a boiler shop during working hours and a horse fiddle at a country serenade.

As one walked along the streets of Chinatown he noticed on many doorways a sign which read something like this: "Merchants' Social Club. None But Members Admitted." There would be a little iron wicket on one side of the door through which the password goes and some Chinese characters on the walls. There were dozens of these clubs in Chinatown, all incorporated and protected by law. But they were simply gambling joints into which men of other nationalities were not admitted, and where members could gamble without fear of in-

terruption by the police. Chinamen are born gamblers and will wager their last dollar on the turn of a card. Perhaps if 25,000 Americans or Englishmen or Russians were located in the heart of a Chinese city without any of the restraining influences of home life, they would seek to while away their idle hours at draw poker or as many other forms of gambling as John Chinaman indulges in. The Chinamen have little faith in one another so far as honesty goes. In many of the clubs the funds of the club are kept in a big safe which in addition to having a time lock, has four padlocks, one for each of the principal officers, and the safe can only be opened when all four are present. Often when the police raided a den that was not incorporated they found that the chips and cards had disappeared as if by magic and the players were sitting about as unconcerned as though a poker game had never been thought of. An advance tip had been sent in by a confederate on the private Chinese grapevine telegraph.

The troubles that arise between members of a Chinese secret society are settled within the society, but when trouble arises between the members of rival secret societies then it means death to somebody. For instance, a Chinaman caught cheating at cards is killed. The society to which the dead man belongs makes a demand on the society to which the man who killed him belongs for a heavy indemnity in cash. If it is not paid on a certain date, a certain number of members of the society, usually the Highbinder or hoodlum element, is detailed to kill a member of the other society. A price is fixed for the killing and is paid as soon as the job is done. The favorite weapon of the Highbinder is a long knife made of a file, with a brass knob and heavy handle. The other weapon in common use is a 45-calibre Colt's revolver. The first one of the detail that meets the victim selected slips up behind him and shoots or stabs him in the back. It may be in a dark alley at midnight, in an opium den, at the entrance to a theater, or in the victim's bed. If the assassin is arrested the society furnishes witness to prove an alibi and money

to retain a lawyer. Another favorite pastime of the Highbinder who is usually a loafer, is to levy blackmail on a wealthy Chinaman. If the sum demanded is not paid the victim's life is not worth 30 cents. One of the famous victims of the Highbinders in recent years in San Francisco was "Little Pete," a Chinaman who was worth $150,000 and owned a gambling palace. He refused to be held by blackmailers and lost his life in consequence.

The police of San Francisco took no stock in a Chinaman's oath as administered in American courts. A Chinaman don't believe in the Bible and therefore does not regard an oath as binding. In one instance it is asserted the chief had been approached by a member of one of the strongest secret societies and asked what attorney was to prosecute a certain Highbinder under arrest. Asked why he wished to know, he stated frankly that another man was about to be assassinated and he desired to retain a certain lawyer in advance to defend him if he was not already employed by the commonwealth. It is no easy matter for the police to secure the conviction of a Chinaman charged with any crime, let alone that of murder. There is only one place where a policeman will believe a Chinaman. That is in a cemetery, while a chicken's head is being cut off. If asked any questions at that time, after certain Chinese words have been repeated, a Chinaman will tell the truth, so the police believe. Although all Chinaman are smooth faced and have their heads shaved they do not "look alike" to the policemen, who have no trouble in telling them apart. This, of course, applied only to the policemen detailed to look after Chinatown. If it were not that the Chinamen kill only men of their own race and let alone all other men, the citizens of San Francisco would have sacked and burned Chinatown. Once the Highbinders were rooted out of the city, and before the catastrophe they were going to do so again.

Some time ago a Chinese shrimp fisherman incurred the displeasure of the members of another society and he was kidnaped in the night and taken to a lonely, uninhabited island some miles

from San Francisco, tied hand and foot and fastened tight to stakes driven in the ground and left to die. Two days later he was found by friends, purely by accident and released, famished and worn out, but he refused to tell who his captors were, and again become a victim of the terrible Highbinders, the curse of the Pacific coast.

Incidents of the above characters nearly always ending in murder, were so common that the wealthy and powerful Chinese Six Companies, the big merchants of the race, held years ago meetings with the purpose of bringing the societies to peace and while they often succeeded the truce between them was only temporary.

Of all the dark, secretive and lawless Chinese villages that dot the wayward Pacific slope, the one that looks down on the arm of San Francisco Bay, just this side of San Pedro Point, is the most mysterious and lawless. The village hasn't even a name to identify it, but "No Sabe" would be the most characteristic title for the settlement, because that is the only expression chance visitors and the officers of the law can get out of its sullen, stubborn, suspicious inhabitants.

They don't deride the laws of this land. They simply ignore them.

They are a law unto themselves, have their own tribunals, officers, fines and punishments and woe betide the member who doesn't submit. He might cry out for the white man's law to protect him, but long before his cry could reach the white man's ear it would be lost in that lonely, secretive village and the first officer that reached the place would be greeted by the usual stoical, "No sabe."

Police and other investigations showed that for years past the slavery of girls and women in Chinatown was at all times deplorable and something horrible. At an investigation, a few years ago, instituted at the instance of the Methodist Mission,

some terrible facts were elicited, the following indicating the nature of nearly all:

The first girl examined testified that her parents sold her into slavery while she was only fifteen years of age. The price paid was $1,980, of which she personally saw $300 paid down as a deposit. Before the final payment was made she escaped to the mission.

The second, an older girl, lived in a house of ill fame for several years before she made her escape. She testified that she was sold for $2,200 by her stepmother. The transaction occurred in this city. She talked at length of the conditions surrounding the girls, including the infamous rule that they must earn a certain sum each day, and the punishments that follow failure. This girl said she knew from other girls of her acquaintance that many white men were in the habit of visiting the Chinese houses.

The third girl who testified said she was sold at a time when slaves were scarcer and higher in price than they are now, and brought $2,800 at the age of fifteen. She, too, was positive that white men visited the Chinese houses of ill fame.

One of the women of the mission showed the committee three little girls, mere babies, who had been rescued by the mission. Two of them were sold by their parents while they were still in arms. The first brought $105 when three months old and another was sold at about the same age for $150. All three were taken from the keepers of houses of ill fame and were living regularly in the houses when rescued.

But there was also a better side to Chinatown. The joss house was an interesting place. It was but a large room without seats. A profusion of very costly grill work and lanterns adorned the ceilings and walls; instruments of war were distributed around the room, and many fierce looking josses peered out from under silken canopies on the shrines. In one corner was a miniature wooden warrior, frantically riding a fiery steed toward a joss who stood in his doorway awaiting the rider's coming. A teapot of

unique design, filled with fresh tea every day, and a very small cup and saucer were always ready for the warrior. This represented a man killed in battle, whose noble steed, missing his master, refused to eat and so pined away and died. A welcome was assured to them in the better land if the work of man can accomplish it. The horse and rider were to them (the Chinese) what the images of saints are to Christians. In another corner was a tiny bowl of water; the gods occasionally come down and wash. At certain times of the year, direct questions were written on slips of paper and put into the hands of one of the greatest josses. These disappear and then the joss either nodded or shook his head in answer. On the altar, or altars, were several brass and copper vessels in which the worshiper left a sandalwood punk burning in such a position that the ashes would fall on the fine sand in the vessel. When one of these became full it was emptied into an immense bronze vase on the balcony, and this, in turn, was emptied into the ocean. The Chinese take good care of their living and never forget their dead. Once a year, the fourteenth day of the seventh month, they have a solemn ceremony by which they send gold and silver and cloth to the great army of the departed.

A furnace is a necessity in a joss house. It is lighted on ceremonial days and paper representing cloth, gold and silver is burned, the ashes of the materials being, in their minds, useful in spirit land. Private families send to their relatives and friends whatever they want by throwing the gold, the silver and the cloth paper, also fruits, into a fire built in the street in front of their houses. The days of worship come on the first and fifteenth of each month.

Of the deaths in Chinatown by the earthquake and fire no reliable list has been possible but in estimating the victims the construction of the district should be regarded as an inconsiderable factor.

CHAPTER XX.

THE NEW SAN FRANCISCO.

A Modern City of Steel on the Ruins of the City that Was—A Beautiful Vista of Boulevards, Parks and Open Spaces Flanked by the Massive Structures of Commerce and the Palaces of Wealth and Fashion.

WITH superb courage and optimism that characterize the American people, San Francisco lifted her head from the ashes, and, as Kipling says, "turned her face home to the instant need of things."

Scorched and warped by days and nights of fire, the indomitable spirit of the Golden Gate metropolis rose on pinions of hope, unsubdued and unafraid.

Old San Francisco was an ash heap. From out the wreck and ruin there should arise a new San Francisco that would at once be the pride of the Pacific coast and the American nation and a proud monument to the city that was.

Temporarily the commerce of the city was transferred to Oakland, with its magnificent harbor across the bay, and at once a spirit of friendly rivalry sprung up in the latter city. Oakland had been the first haven of refuge for the fleeing thousands, but in the face of the overwhelming disaster the sister city saw a grand opportunity to enhance its own commercial importance.

But the spirit of San Francisco would brook no successful rivalry and its leading men were united in a determination to rebuild a city beautiful on the ashen site and to regain and reestablish its commercial supremacy on the Pacific coast.

With the fire quenched, the hungry fed, some sort of shelter provided, the next step was to prepare for the resumption of business and the reconstruction of the city. Within ten days

from the first outbreak of flames the soldiers had begun to impress the passer-by into the service of throwing bricks and other debris out of the street in order to remove the stuff from the path of travel.

Some important personages were unceremoniously put to work by the unbiased guards, among them being Secretary of State Charles Curry of Sacramento.

The people of San Francisco turned their eyes to a new and greater city. Visitors were overwhelmed with terror of the shaking of the earth, they quailed at the thought of the fire. But the men who crossed the arid plains, who went thirsty and hungry and braved the Indian and faced hardships unflinchingly in their quest for gold over two-thirds of a century ago had left behind them descendants who were not cowards. Smoke was still rising from the debris of one building while the owner was planning the erection of another and still better one.

The disaster had made common cause, and the laboring man who before was seeking to gouge from his employer and the employer who was scheming to turn the tables on his employes felt the need of co-operation and cast aside their differences, and worked for the common cause, a new and a greater San Francisco.

Fire could not stop them, nor the earthquake daunt. They talked of beautiful boulevards, of lofty and solid steel and concrete buildings and of the sweeping away of the slums. They talked of many things and they were enthusiastic. They said that the old Chinatown would be driven away to Hunter's Point in the southeastern portion of the city near the slaughter-houses. They said the business district should be given a chance to go over there where it belonged, by right of commanding and convenient position. They talked of magnificent palaces to take the place of those that had fallen before the earthquake, fire and dynamite. Courage conquers. We are proud of the American spirit which arises above all difficulties.

But there are some things which could not be replaced. There could not be another Chinatown like the old one, with all its quaint nooks and alleys. All this was gone and a new Chinatown must seem like a sham. There were no more quaint buildings in the Latin quarter, with their old world atmosphere.

Coppas place, center of real bohemia, where artists for many years congregated and adorned the walls with pictures, still remained. But it was lonesome; all its fellows were gone; it was surrounded by ruins. Not an old place remained with a story or with a sentimental charm. San Francisco went to work with a will to rebuild, ships continued to enter its magnificent harbor, and lived down earthquake and fire to again become a great, prosperous, magnificent city.

But the sentiment of its Latin Quarter was gone, for outside of the Coppas place, there was nothing left of the old and loved San Francisco except the gable tiled roof of Mission Dolores, its plain wooden cross surmounting it, and its sweet-toned chimes long stilled. Their voices should ring out anew at intervals to remind all who may hear them that San Francisco has a storied past and a bright future, a future glorious as the brilliant sunsets that come streaming so magnificently through the Golden Gate.

It should be borne in mind that San Francisco was not destroyed by the earthquake. While old buildings in that part of the city which stood on "made" ground east of Montgomery street and some of that district lying south of Market it is true suffered from the shock, it was fire that wrought the great devastation and wiped out the entire business section and more than half of the residence section of the city.

The great modern steel structures were practically uninjured by the earthquake, except for cracked walls and displaced plaster. All those great structures, of course, subsequently were utterly ruined by the flames as far as the interior construction was concerned, but the walls were in most cases intact. The most notable cases of practical immunity from the shock were the St.

Francis Hotel, the Fairmont Hotel, the Flood buildings, the Mills building, the Spreckels buildings, the Chronicle building and scores of other modern steel structures.

The branch of the United States mint on Fifth street and the new postoffice at Seventh and Mission streets were striking examples of the superiority of the workmanship put into federal buildings. The old mint building, surrounded by a wide space of pavement, was absolutely unharmed. Not even the few palm trees which stand on either side of its broad entrance were withered by the flames that devoured everything around it.

The new postoffice building also was virtually undamaged by fire. The earthquake shock did some damage to the different entrances to the building; the walls were uninjured. Every window pane, of course, was gone, as they were in almost every building in town, but the government was able to resume postal business immediately.

The Fairmont Hotel, while seriously damaged in the interior, was left intact as to the walls and the management offered space in the building to the various relief committees who desired to house the homeless or to store supplies in those parts of the building considered safe.

One question that confronted the rebuilders was whether the city's level had sunk as a result of the earthquake.

Parties sent out by City Engineer Thomas P. Woodward for the purpose of ascertaining whether or not the city, as a whole, had sunk, reported that there was no general depression, though there were many spaces where there were bad depressions. The most notable depressions were on Valencia, from Nineteenth to Twentieth; lower Market, Howard and Seventeenth and Eighteenth; Van Ness, from Vallejo to Green, and on Folsom in the region of Seventeenth street.

The southeast corner of the new postoffice building extended over an old swamp, and here there was a depression of fully four feet. The sinking was confined almost entirely to the lower

AFTER THE FIRE. The above picture shows how completely the business section was burned out—making it necessary to raze the dangerous walls left standing.

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RUINS OF EMANUEL SYNAGOGUE. The most noted Jewish House of Worship in the West was completely destroyed by the fire.

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parts of the city, and particularly to "made" ground. Mr. Woodward gave it as his opinion that there was no general depression of the city whatever.

City Engineer Woodward was one of those who devised a general scheme for rebuilding the city, by which the new San Francisco was to be a city of magnificent buildings, terraces, boulevards, green parks and playgrounds and gardens.

One prominent feature of Mr. Woodward's comprehensive scheme was the widening of Van Ness avenue into a magnificent boulevard. To this end he proposed the acquisition by the city through condemnation proceedings of all that choice residence property the full length of Van Ness avenue.

Under his plan there would be no narrow and clogging streets in those sections of the city laid bare by the fire. Streets in the heart of the business district which were proved entirely inadequate for the rush and confusion of a big metropolis were to be widened by slicing from the private holdings on either side, again through process of the courts.

Market street was to be left as it was. So with Third and other streets that were repaired by the city authorities just before the earthquake, but streets in the commission and wholesale sections were to be radically altered, both in width and course.

The big construction companies of New York took a great interest in the San Francisco disaster, especially as far as the damages to building was concerned.

One of the largest construction companies in the world started an engineer for San Francisco at once.

Great satisfaction was expressed by the architects of the San Francisco Chronicle building that the structure had withstood the shocks in good shape and was practically uninjured until assailed on all sides by flames. The Chronicle building was of steel framework, with the outer walls partially anchored to the frame.

George Simpson, the chief engineer of the company that built

the Chronicle building, was of the opinion that the big modern buildings of Chicago and New York would withstand such earthquake shocks as those felt in San Francisco.

"The east, and especially New York city," said Mr. Simpson, "is far ahead of the west in the matter of thorough building construction. In the case of our modern buildings the steel framework sits on a bed of concrete that has been built on top of solid rock foundation.

"Now, it will be observed that all of the steel frame buildings in San Francisco withstood the shocks and the only damage done to them outside of fire was the falling out of part of the walls. In these cases the outer walls were merely built on the steel work. With our big buildings the walls are anchored to the steel framework. That is, each big piece of stone has imbedded in it a steel bar from which another arm of the same material runs in at right angles and is riveted or bolted to the framework.

"That is what I meant by anchored walls and in the event of an earthquake it would take a terrific shock to loosen these walls. Were it possible to erect an entire steel building resting on a solid foundation there would be no fear from earthquakes. In the Philippines they are now building some churches of steel framework with a sheet iron covering. This is done in anticipation of earthquake shocks."

The rebuilding of Baltimore required 30,100 tons of structural steel. To rebuild San Francisco on the same basis the estimate was 60,000 tons amounting with freight to $6,000,000.

As compared with the loss of $200,000,000 this was an insignificant amount.

Among those who submitted a comprehensive scheme for a new San Francisco was Daniel Hudson Burnham, the noted architect of Chicago, who designed most of the features of Chicago's World's Columbian Exposition and from whose conceptions the Court of Honor at that exhibition was built, and those who visited the White City in 1893 will never forget the picturesque

grandeur of that enchanted region. Mr. Burnham believed in a new and ideal San Francisco and would see it take its place as the American Paris in the arrangement of its streets and the American Naples in the beauty of its bay and skies. The plans for the ideal San Francisco were his, and hardly had his report been printed than the columns of the old city went down to ruin and fire swept out of existence the landmarks by the gate of gold.

It is now the question, How far will the new San Francisco realize the dreams of those who have had before them for so many years the image of a metropolis of the Pacific with broad boulevards and great parkways and wooded heights—a city of sunken gardens, of airy bridges, of stately gardens and broad expanses?

Daniel H. Burnham had back of him a long record of achievements which earned for him his title of city builder.

He built the Rookery building and the Masonic Temple in Chicago, and then was called to various cities where he supervised the erection of imposing piles which have become landmarks. It was while studying the relations of these large buildings to their surroundings that he became interested in his still greater work, which had to do with squares and blocks and parkways.

Upon the invitation of the Association for the Improvement and Adornment of San Francisco Mr. Burnham went to the Golden Gate, where he devoted months to the plans for a new city. A bungalow was built on the Twins Peaks seven hundred feet above the level of the streets, from which Mr. Burnham and his staff of assistants could command a view of the city and the bay. The material which they sought to make into the perfect city was before them day and night. They saw San Francisco by sunlight, in fog, in storm or in the blaze of a myriad lights. As the work progressed the San Franciscans who were interested in the scheme often climbed to the bungalow to watch the progress of the work.

The scheme prepared by Mr. Burnham provided first for a civic centre where all the principal city buildings were to be located and also the new union railroad station. About this was to be a broad circular boulevard, a perimeter of distribution, and beyond this a series of broader boulevards or parkways connecting the hills, which were to be converted into parks themselves.

About this was to have been the circling boulevard following the shore line of the peninsula. The scheme included also the extension of the avenue leading to the Golden Gate Park, known as the Panhandle, the building of a Greek amphitheater on the Twin Peaks, with a statue of San Francisco greeting the countries of the Orient. The plan also provided for a new parade ground at the Presidio and the building of numerous parks and playgrounds throughout the city. All this was to have cost millions, but to a man of the largeness of the City Builder this was a detail which was to be reckoned with year by year.

Now that buildings which were to have been acquired by the city to make room for the pathways of the ideal San Francisco are in ashes and twisted beams it may be that the vision of Daniel H. Burnham may soon be realized.

"It is an unfortunate thing," he said, "that our American cities are not first laid out in accordance with some definite idea. As a matter of fact, however, they simply grow up and later have to be changed in order to give them symmetry. In Europe the whole idea is different. The government has more control over such affairs than it has in this country, and it prescribes just what the height of the buildings shall be, The result is a skyline which is imposing. In this country each man builds for himself.

Pending the action of the authorities on the plans for the San Francisco Beautiful Mr. Burnham had little to say about the rebuilding. The boulevards connecting the hills were to have been made by taking out blocks of houses, most of which were in poorer sections of the city. This would give a passageway more than two hundred feet wide. The buildings which would have

been condemned have been destroyed, and it then became a question as to whether the authorities of the city would be able to make the change contemplated.

Mr. Burnham's plan for the New San Francisco left Chinatown out of the reckoning, as there was talk of private capital arranging for the transfer of the quarter to another part of the city. It was the opinion of Mr. Burnham that Chinatown, as occupying a valuable section of San Francisco, would eventually have to go.

"Twin Peaks," runs the report made by Mr. Burnham, "and the property lying around them, should be acquired for park purposes by the city. The idea was to weave park and residence districts into interesting and economic relations, and also to preserve from the encroachments of building the hill bordered valley running to Lake Merced, so that the vista from the parks to the ocean should be unbroken. It is planned to preserve the beautiful canyon or glen to the south of Twin Peaks and also to maintain as far as possible the wooded background formed by the hills looking south from Golden Gate. This park area of the Twin Peaks, which includes the hills which surround the San Miguel Valley and is terminated by Lake Merced, is a link in the chain of parks girdling the city.

"To the north of Twin Peaks lies a natural hollow. Here it was proposed to create an amphitheatre or stadium of vast proportions. The gentler slopes of the Twin Peaks were to be used as villa properties. The plans for Twin Peaks also included a collective centre or academy, which is to be arranged for the accommodation of men in various branches of intellectual or artistic pursuits. A little open air theatre, after the Greek model, would form a part of this scheme."

Even Telegraph Hill was to have its precipitate sides terraced and was to be transformed into a park, according to the design of Mr. Burnham. To carry out all the plans of the architect would be a large task just now, but the citizens of the new

San Francisco expect that the broad general lines will be laid down and then in the course of time the rest will be added.

Unexampled as was the loss of property in San Francisco the disaster in that respect alone was converted into a permanent benefit.

No other city with the exception of Chicago ever had such a grand opportunity of rebuilding upon a basis of permanency and beauty.

Instead of shrinking, real estate values rose rapidly and continued to rise. Fancy figures were quoted on sites suitable for business establishments. Structures that remained comparatively intact not far from the old business section were leased at extremely high rates.

Instead of dooming San Francisco the double attack of fire and quake proved a blessing. Unaccountable as it may be to many people in the eastern states, the denizens of that part of the country had no especial fears of a recurrence of the catastrophe. They argued that seismic disturbances of such intensity come once in fifty or one hundred years.

"Next time we will be prepared," was the regulation comment. The faith of those people, their courage and their enduring hope obliterated all doubt and crushed timidity. The watchword from the day of the disaster was "rebuild." And generally there was added the injunction, "and make it earthquake proof."

CHAPTER XXI.

VESUVIUS THREATENS NAPLES.

Beautiful Italian City on the Mediterranean Almost Engulfed in Ashes and Lava from the Terrible Volcano—Worst Eruption Since the Days of Pompeii and Herculaneum—Buildings Crushed and Thousands Rendered Homeless.

THE worst eruption of Mt. Vesuvius since the days when it buried under molten lava and ashes Pompeii and Herculaneum occurred on April 6, 1906. Almost without warning the huge crater opened its fiery mouth and poured from its throat and fiery interior and poured down the mountain sides oceans of burning lava, and warned 60,000 or 70,000 inhabitants of villages in the paths of the fiery floods that their only safety was in immediate flight. From the very start the scene was terrible and awe-inspiring. From the summit of the mountain a column of fire fully 1,000 feet leaped upward and lighted by its awful glare the sky and sea for miles around. Occasionally great masses of molten stone, some weighing as much as a ton were, accompanied by a thunderous noise, ejected from the crater and sent crashing down the mountain side, causing the natives, even as far as Naples, to quake with fear, abandon their homes and fall, praying, on their knees. One of the immense streams of lava which flowed from the crater's mouth was more than 200 feet wide and, ever broadening, kept advancing at the rate of 21 feet a minute.

The first great modern eruption was that of 1631, eleven years after the pilgrim fathers landed on Plymouth rock. A sudden tidal wave of lava, utterly unexpected, engulfed 18,000 people, many of the coast towns being wholly and the remainder partially wiped out.

In 1707 the volcano sent forth a cloud of ashes so dense that at midday in the streets of Naples the blackness of the darkest night reigned supreme. The shrieks of terror stricken women pierced the air and the churches were crowded by the populace. The relics of San Januarius—his skull among them—were carried in procession through the streets.

Thirty years later a stream of lava one mile wide and containing 300,000,000 cubic feet burst from the mountain side. The next notable eruption was that of 1760, when new cones formed at the side and gave forth lava, smoke and ashes. Seven years later the king of Naples hastily retreated into the capital from the palace at Portici, threatened by a fresh outburst, and found the Neapolitans again in confusion.

An eruption lasting a year and a half commenced in 1793. Lava was emitted for fifteen hours and the sea boiled 100 yards from the coast.

That the Vesuvius eruptions are gaining in frequency is attested by the record of the nineteenth century, surpassing as it does that of the eighteenth. The first of note occurred in 1822, when the top of the great cone fell in and a lava stream a mile in width poured out. Twelve years later a river of lava nine miles long wiped out a town of 500 houses.

Lava flowed almost to the gates of Naples in 1855 and caused a deplorable loss of property to the cultivated region above.

Blocks of stone forty-five feet in circumference were hurled down the mountain by the spectacular outburst of 1872. Two lava floods rushed down the valley on two sides, ashes were shot thousands of feet in the air and the sea rose for miles. More than 20,000,000 cubic feet of lava was ejected in a single day.

Since 1879 Vesuvius has been variously active there being two eruptions of note in 1900 and two others in 1903. But that of 1905 was more violent than any since 1872. Red hot stones hurled 1,600 feet above the cone dropped down the flanks of the mountain with deafening sound. One stone thrown out weighed

two tons, while 1,844 violent explosions were recorded in a single day by the instruments of the seismic observatory.

The cog railroad running nearly to the top has been badly damaged a number of times in recent years and the occupants of the meteorological observatory on or near the summit have had several narrow escapes.

This institution is situated about a mile and a half from the cone, near the foot of the rope railway ascending that troubled apex. It is a handsome edifice of white stone and can be seen at a great distance against the black background of lava. It stands on the side toward Naples, on the top of a conspicuous ridge 2,080 feet above the level of the sea. On each side of this ridge flows a river of lava during eruptions, but the building has withstood all, unscathed, as yet.

An observer is on duty, night and day, even during the most violent outbursts. During the late one, when a sheet of red-hot lava glowed on either side of the ridge and when fiery projectiles fell all about, the post was not deserted. Inside, mounted upon piers penetrating the ground, are delicate instruments whose indicating hands, resting against record sheets of paper, trace every movement made by the shuddering mountain. One sign by which these great outbursts may almost always be forecast is the falling of water in the wells of the neighboring villages.

The Vesuvian volcanic region, like that of Aetna, is partly land and partly sea, including all of the Bay of Naples, sometimes called "the crater," lying at the very foot of Vesuvius, with a circuit of fifty-two miles and the metropolis at the extreme northern corner.

The whole base of the mountain is skirted by a series of villages where abide 100,000 souls—birds nesting in the cannon's mouth. Between these settlements and even above, within the jaws of the fiery demon, the tourist sees scattered huts, tent shaped of straw interwoven.

A road twenty miles long, commencing at Naples, extends

southeastwardly along the shore of the bay and then, winding inland, completely encircles the mountain. This is dotted with villages, all within hearing of the volcanic rumblings and bellowings.

Four miles down the bay road from Naples lies Portici, its 12,000 population dwelling upon lava thrown down to the sea by the eruption of 1631. On this black bed stands the royal palace, built by Charles III. in 1738. Resina, one mile further, is the favorite suburban seat of wealthy Neapolitans. Its 14,000 residents dwell partly upon the ruins of Herculaneum and of Retina, to which latter city Pliny the elder set out during the great eruption which destroyed these cities and Pompeii.

The colossal brazier of Mount Vesuvius dealt most awfully and destructively with the towns on its declivities and near its base. The inhabitants of those villages naturally became panic-stricken and abandoned their homes for the open, although the atmosphere was dense with volcanic ashes and the sulphur fumes of subterreanean fires. The people, so long as they dared remain near their homes, crowded the churches day and night, praying for deliverance from the impending peril, manifestations of which were hourly heard and felt in explosions which resembled a heavy cannonade, and in the tremblings of the earth, which were constantly recurring.

The intense heat of the lava destroyed vegetation before the stream reached it. The peasants of Portici, at the west foot of Vesuvius, cleared their grounds of vineyards and trees in the effort to lessen the danger from the fire and resist the progress of the lava to the utmost.

The streams of lava became resistless. They snapped like pipe stems the trunks of chestnut trees hundreds of years old and blighted with their torrid breath the blooms on the peach trees before the trees themselves had been reached. The molten streams did not spare the homes of the peasants, and when these have been razed they dash into the wells, as though seeking to

slake their thirst, and, having filled them, continue their course down the mountain side.

Everywhere in the vicinity of the volcano pitiful scenes were witnessed—women tearing their hair in their grief and old men crying aloud at the loss of their beloved homesteads, while in the distance, in striking contrast, were the sapphire-colored Mediterranean, the violet-hued mountains of the Sorrento peninsula and the island of Capri in the tranquil sea.

The town of Bosco Trecase, on the mountain's southern declivity, had been transformed into a gray island of ruin by the ashes from the crater of the volcano. Torrents of liquid fire, resembling in the distance serpents with glittering yellow and black scales, coursed in all directions, amid rumblings, detonations and earth tremblings while a pall of sulphurous smoke that hovered over all made breathing difficult.

While the inhabitants, driven before soldiers, were urged to seek safety in flight, fiery lava was invading their homes and the cemetery where their dead was buried. In about 48 hours after the eruptions began not a trace remained of Bosco Trecase, a city of 10,000 population. Several lads who were unharmed when the danger following the eruptions of Mount Vesuvius seemed most imminent subsequently ventured to walk on the cooling lava. They went too far and the crust broke under their weight. They were swallowed up before the helpless onlookers.

About the same time the village of Bosco Reale, to the eastward, became threatened, and the women of the village, weeping with fright, carried a statue of St. Anne as near as they could go to the flowing lava, imploring a miracle to stay the advance of the consuming stream. As the fiery tide persisted in advancing the statue had to be frequently moved backward.

Ottajano, at the northeast foot of the mountain, and 12 miles from Naples, was in the path of destruction and the scenes there when the first victims were unearthed were most terrible. The positions of the bodies showed that the victims had died while in

a state of great terror, the faces being convulsed with fear. Three bodies were found in a confessional of one of the fallen churches.

One body was that of an old woman who was sitting with her right arm raised as though to ward off the advancing danger. The second was that of a child about 8 years old. It was found dead in a position which would indicate that the child had fallen with a little dog close to it and had died with one arm raised across its face to protect itself and its pet from the crumbling ruins. The third body, that of a woman, was reduced to an unrecognizable mass.

Other bodies which were found later caused such an impression among the already frantic population that the authorities did not deem it advisable to permit any more bodies to be identified for the time being.

Five churches and ten houses fell under the weight of ashes and cinders, which lay over four feet deep on the ground. Many were killed and injured.

One mile southward from the site of Bosco Trecase, on the shore of the Gulf of Naples, is Torre Annunziata, a city of 30,000 inhabitants, and the streams of lava having almost surrounded it the inhabitants deserted their homes in terror and fled to Naples and other points. This place was destroyed by an eruption in 1631. At the northern boundary of the town is a picturesque cypress-planted cemetery, and there the lava stream was halted and turned aside. It was as if the dead had effectually cried out to arrest the crushing river of flame, as at Catania the veil of St. Agathe is said to have stayed a similar stream from Mount Etna.

The visit of the King and Queen of Italy and the Duke of Aosta to the town caused a rumor to be started by the excited people, and particularly among the panic-stricken women, that their presence had resulted in a miracle, and, singularly enough, shortly after the arrival of the sovereigns, and while the King and Queen were trying to console the people, repeating frequently,

"Courage! Be strong!" the wind suddenly changed and the atmosphere, which up to that moment had been impregnated with sulphurous gas and suffocating fumes, cleared away and the sun burst forth. The stream of lava stopped its march, after having destroyed a section of the northeast part of the suburb.

The air rang with benedictions for the King from his devoted subjects. Hope at once returned and the King and Queen were preparing to move on, but the people insisted that they remain, begging that they be not abandoned. The King and Queen wished to visit Torre Del Greco, which is only seven miles distant from Naples, and was also in danger of being wiped out, and the people fled from it in dismay, amid a continued fall of sand and ashes, to points of reputed safety. This village had been eight times destroyed and as often rebuilt. A violent storm of sulphurous rain occurred at San Giuseppe, Vesuviana and Saviano.

The town of Nola, an old place of 15,000 inhabitants, twenty-two miles from Naples, was almost buried under the shower of ashes coming from the crater, which were carried by the wind as far as the Adriatic sea.

The inhabitants of the country in the vicinity of Caserta, a place of about 35,000 people, and termed the Versailles of Naples, were also endangered by cinder ashes and flowing lava.

The village of San Gennaro was partially buried in sand and ashes and several houses were crushed. At that place three persons were killed and more than twenty injured.

Sarno, Portici, Ciricello, Poggio and Morino became practically uninhabitable because of the ashes and fumes, and the people fled from the town. At Sarno three churches and the municipal buildings collapsed. The sand and cinders were six feet deep there and all the inhabitants sought safety in flight.

Sarno is a town of some 10,000 people and is situated about ten miles east of Mount Vesuvius. It contains an old castle, some

sulphur baths and manufactories of paper, copper wares, cotton goods and silk fabrics.

Almost equal to the devastation wrought by the lava was the damage done by cinders and ashes, which in increditable quantities had been carried great distances. This has caused the practical destruction of San Guiseppe, a place of 6,000 inhabitants. All but 200 of the people had fled from there and of these 200 who had assembled in a church to attend mass about 100 were killed.

While the priest was performing his sacred office the roof fell in and all who were not killed were badly injured. These unfortunates were for hours without surgical or medical assistance. The only thing left standing in the church was a statue of St. Anne, the preservation of which the poor, homeless people accepted as a miracle and promise of deliverance from their peril.

A runaway train from San Guiseppe for Naples was derailed, owing to showers of stones from the crater. At some points near the mountain it was estimated that the sands and ashes reached a height of nearly 150 feet.

San Georgio, Cremona, Somma Vesuviana, Resina and other inland and coast towns not mentioned above, also suffered terrible devastation.

The most of the buildings in the villages were of flimsy construction with flat roofs and so were but poorly calculated to bear the weight of ashes and cinders that fell upon them. Inevitably it was found that a considerable number of persons perished by the falling of their homes.

National and local authorities from the first evidences of danger attempted the evacuation of the threatened villages and towns, but adequate means to transport the inhabitants were lacking, although thousands of soldiers with artillery carts had been sent to the places where the sufferers were most in need of assistance.

At many places the people were suffering from panic and a

state of great confusion existed, which was added to by superstition. Some of the parish priests refused to open their churches to people who tried to obtain admittance, fearing that an earthquake would destroy the buildings when full of people and thus increase the list of disasters.

Crowds of women thereupon attacked the churches, pulled down the doors and took possession of the pictures and statues of the saints, which they carried about as a protection against death.

Many people camped along the roads and in the fields, where they thought they would be safer than in the towns, defying the elements, though nearly blinded by ashes, wet to the skin by rain and terrorized by the gigantic curved flaming mass above, resembling a scimitar ready to fall upon them.

The atmosphere during the eruptions was oppressive and yellow with ashes from Vesuvius, causing a feeling of apprehension regarding what the future may hold in store for this city and its vicinity. The volcano was completely hidden in a dense mass of cinder-laden smoke, the only other signs of activity being frequent and very severe detonations and deep rumblings.

All the trains from and to Naples were delayed owing to the tracks being covered with cinders and telegraphic communication with all points was badly congested.

An excursion steamer attempting to reach Naples from the island of Capri had to return, as the passengers were being suffocated by the ashes.

The quantity of ashes and cinders thrown during the eruptions was unprecedented. An analysis showed this discharge to be chiefly composed of iron, sulphur and magnesia. When dry the whole region seemed to be under a gray sheet, but after a fall of rain it appeared to have been transformed into an immense lake of chocolate.

During the activity of the mountain several new craters had

opened, especially on its north side and from which streams of lava flooded the beautiful, prosperous and happy land lying on the southeast shores of the Gulf of Naples.

The whole of Vesuvius district as far as Naples, Casserta and Castellammare became one vast desert. The high cone of the volcano was almost entirely destroyed having been swallowed up, so that the height of the mountain is now several hundred feet less than formerly. Its falling in caused a great discharge of red hot stones, flame and smoke.

Professor Di Lorenzo, the scientist and specialist in the study of volcanoes, estimated that the smoke from Vesuvius had reached the height of 25,000 feet. After one of the eruptions ashes from Vesuvius were noticeable in Sicily which is a large island near the extreme end of the peninsula on which Naples is situated and some 200 miles from the crater.

RUINS OF GRACE EPISCOPAL CHURCH. This was one of the most beautiful church edifices in the Golden Gate City, and while not harmed by the earthquake, it was totally ruined by the conflagration which followed.

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RUINS OF CITY HALL. This famous building completed at a cost of about $6,000,000 suffered most severely from the earthquake, but it nevertheless proves that proper steel construction will withstand such shocks, as evidenced by the framework of the tower which is still intact.

CHAPTER XXII.

SCENES IN FRIGHTENED NAPLES.

Blistering Showers of Hot Ashes—The People Frantic—Cry Everywhere "When Will It End?" — Atmosphere Charged with Electricity and Poisonous Fumes.

FROM the first outburst and glare of the eruption all Naples became aroused and trembled with anticipations of horror, and when the hot ashes from the crater of Vesuvius began to fall in blistering showers upon it the entire populace was seized with a fear, which for days was constant, that at any moment they might be crushed into eternity by the awful outpourings from the cauldron of the mountain which was in truth as veritable an inferno as that pictured by Dante. The streets for days, even up to the subsidence of the eruption, were packed with surging crowds, all of whom were fatigued from fear and loss of rest, yet there was hardly one in all the thousands who had not strength enough to pray to the Almighty for deliverance.

At times the fall of sand and ashes appeared to be diminishing, but in the next instant it came again, apparently in greater force than before. The city became frantic from fear and everywhere was heard: "When will it all end?"

The people deserted their shops, the manufactories were nearly all shut down, while the theaters, cafes and places of amusements throughout the city were all closed. The crowds were in a temper for any excess and it would only require a spark to start a conflagration that would have almost equalled that of Vesuvius itself.

When the coating of ashes and cinders covered the ground and

roofs of buildings the people believed that their loved and beautiful Naples was doomed, and would be known thereafter only to archaeologists like other cities which Vesuvius in its wrath had overwhelmed.

All railroad service out of the city was interrupted, the engineers refusing to take out their trains because of the darkness caused by the heavy fall of ashes.

Troops were kept constantly clearing the roofs of buildings of the accumulation of sand and ashes which endangered the structures. The large glass-covered galleries throughout the city, were ordered closed lest the weight upon the roofs should cause them to collapse.

Warships and soldiers which had been ordered to the city did effective service in succoring the most distressed and in the removal of refugees. Their presence was also potent in keeping up public confidence and maintaining order. No danger was too great for the troops to encounter and no fatigue too severe for them. They earned the gratitude and admiration of the people by their devotion to duty and bravery. Not only were they credited with many acts of heroism but they displayed untiring perseverance in searching for the living and the dead among tottering walls, assisting fugitives to reach places of safety, giving aid to the wounded and in burying the dead, and all this while partly suffocated by the ash and cinder laden wind blowing from the volcano.

The employes of a tobacco factory at Naples, thinking the roof was about to fall in fled in panic from the building and communicated their fears to so many people outside that the police were compelled to interfere and restore order. Many persons were injured during the panic.

The prisoners in the city jail mutinied owing to fright and succeeded in breaking open some of the doors inside the building, but were finally subdued by the guards.

King Victor Emmanuel and his Queen, the Duke and Duchess

of Aosta and others of the royal household were active in rendering aid. The king placed the royal palace of Cappodimonti, situated above this city, at the disposal of the wounded refugees. Firemen and ambulance corps were sent from Rome to aid the sufferers.

The work of succor was hampered owing to delays to the railway service, which was interrupted by red-hot stones thrown to a height of 3,000 feet falling on the tracks.

Not for a century had Naples been so threatened nor its people thrown into such a state of panic. Men, women and children tramped about the streets, raving that their deity had forgotten them and that the end of the world was in sight.

Thousands of people flocked from the towns and farms on the slopes of the mountain and the problem of feeding and caring for the horde had grown serious. These people were left homeless by the streams of lava, which lapped up all their property in some cases within a half hour after the owners had fled.

Earthquake shocks which shattered windows and cracked the walls of buildings added to the terror and when a shock occurred the entire population rushed to the streets in terror, many persons crying, "The Madonna has forsaken us; the end of the world has come."

Vessels lying in the harbor rapidly put to sea with hundreds of the wealthy families, who chartered them outright, while many other ships left because of fear of tidal waves similar to those accompanying the terrific eruption of a century ago, which wrecked scores of vessels and drowned thousands of people here.

The atmosphere of the city became heavily charged with electricity, while breathing at times became almost impossible because of the poisonous fumes and smoke. The detonations from the volcano resembled those of terrible explosions and the falling of the hot ashes made life indeed a burden for the Neapolitans.

The churches of the city were open during the days and nights and were crowded with panic-stricken people. Members of the

clergy did their utmost to calm their fears, but the effects of their arguments went almost for naught when renewed earthquake shocks were experienced.

While Mount Vesuvius continued active volumes of cinders and ashes emitted from the volcano fell upon the buildings and streets driving the inhabitants of the city into a condition bordering on frenzy. All night people roamed the streets praying and crying that they might be spared.

The collapse of the Mount Oliveto market, in which 200 or more persons were caught, many being crushed beyond recognition and the continuous rain of sand and ashes throughout the city sent terror to the heart of every Neapolitan.

This market covered a plat of ground 600 feet square. The scenes in the vicinity of the ruins were agonizing, relatives of the victims clamoring to be allowed to go to their dead or dying.

The people seemed demented. They surrounded the market, in many cases tearing their hair, cursing and screaming, "Oh, my husband is there!" or, "Bring out my child!" and endeavoring with their own hands to move heavy beams, from beneath which the groans of the injured were issuing.

The cries for help were so heartrending that even rescuers were heard to sob aloud as they worked with feverish eagerness to save life or extract the bodies of the dead from the ruins.

Some of the people about the market were heard to exclaim that a curse rested upon the people of Naples for repudiating their saints Monday, when Mount Vesuvius was in its most violent mood.

Even with the sun shining high in the heavens the light was a dim yellow, in the midst of which the few people who remained in the stricken towns, their clothing, hair and beards covered with ashes, moved about in the awful stillness of desolation like gray ghosts.

Railway and tramway travel to and from Naples was much hampered by cinders and ash deposits, and telegraphic commun-

ication with the towns farthest in the danger zone was also for a time interrupted.

The scenic effects varied from hour to hour during the eruptions. At times in the north the sky was chocolate colored, lowering and heavy, under which men and women with their hair and clothing covered with ashes moved above like gray ghosts. Fort San Martino, as it towered above the town, could only just be seen, while Castel Dell'ovo was boldly marked in light, seeming like silver against the brown sky.

To the south beyond the smoke zone lay smiling, sunny Posilipo and its peninsula, while far away glistened the sea a deep blue, on which the islands seemed to float in the glow of the setting sun. Adding to the strange picture, one of the French men of war, which arrived in the bay of Naples was so placed as to be half in the glow and half obscured by the belt of falling ashes.

From the observatory of Mount Vesuvius, where Director Matteucci continued his work in behalf of science and humanity, the scene was one of great impressiveness. To reach the observatory one had to walk for miles over hardened but hot lava covered with sand until he came to a point whence nothing could be seen but vast, gray reaches, sometimes flat and sometimes gathered into huge mounds which took on semblance of human faces.

Above, the heavens were gray like the earth beneath and seemed just as hard and immovable. In all this lonely waste there was no sign of life or vegetation and no sound was heard except the low mutterings of the volcano. One seemed almost impelled to scream aloud to break the horrible stillness of a land seemingly forgotten both by God and man.

In many of the towns some of the inhabitants went about hungry and with throats parched with smoke and dust, seemingly unable to tear themselves away from the ruins of what so recently were their homes.

The Italian minister of finance suspended the collection of taxes in the disturbed provinces and military authorities distributed rations and placed huts and tents at the disposition of the homeless.

The property loss from the volcanic outbreak has been placed at more than $25,000,000, while some have estimated that the number of persons rendered homeless amounted to nearly 150,000. Probably less than one-half of that number would come near the exact figures.

As an evidence of the wide-spread and far-reaching influences set in motion by the eruptions of Vesuvius it should be noted that Father Odenbach of St. Ignatius' college in Cleveland, O., the noted authority on seismic disturbances, reported that his microseismograph, the most delicate instrument known for detecting the presence of earthquakes in any part of the globe, had plainly recorded the disturbances caused by the eruption of Vesuvius. The lines made by the recorder, he said, had shown a wavy motion for several days, indicating a severe agitation in the earth's surface at a remote point.

CHAPTER XXIII

VOLCANOES AND EARTHQUAKES EXPLAINED

BY TRUMBULL WHITE.

The Theories of Science on Seismic Convulsions—Volcanoes Likened to Boils on the Human Body through Which the Fires and Impurities of the Blood Manifest Themselves—Seepage of Ocean Waters through Crevices in the Rock Reach the Internal Fires of the Earth—Steam is Generated and an Explosion Follows—Geysers and Steam Boilers as Illustrations—Views of the World's Most Eminent Scientists Concerning the Causes of Eruption of Mount Pelee and La Soufriere.

THE earth, like the human body, is subject to constitutional derangement. The fires and impurities of the blood manifest themselves in the shape of boils and eruptions upon the human body. The internal heat of the earth and the chemical changes which are constantly taking place in the interior of the globe, manifest themselves outwardly in the form of earthquakes and volcanoes. In other words, a volcano is a boil or eruption upon the earth's surface.

Scientists have advanced many theories concerning the primary causes of volcanoes, and many explanations relating to the igneous matter discharged from their craters. Like the doctors who disagree in the diagnosis of a human malady, the geologists and volcanists are equally unable to agree in all details concerning this form of the earth's ailment. After all theories relating to the cause of volcanoes have been considered, the one that is most tenable and is sustained by the largest number of scientific men is that which traces volcanic effects back to the old accepted cause of internal fires in the center of the earth. Only in this way can the molten streams of lava emitted by volcanoes be accounted for.

The youngest student of familiar science knows that heat generates an upward and outward force, and like all other forces that it follows the path of least resistance. This force is always present in the internal regions of the earth, which for ages upon ages has been gradually cooling from its poles toward its center. When conditions occur by which it can outwardly manifest itself, it follows the natural law and escapes where the crust of the earth is thinnest.

But something more than the mere presence of internal fire is necessary to account for volcanic action, although it may in a large degree account for minor seismic convulsions in the form of an earthquake. The elements which enter into the source of volcanic eruption are fire and water. The characteristic phenomenon of a volcanic eruption is the steam which issues from the crater before the appearance of the molten lava, dust, ashes and scoria. This accepted theory is plainly illustrated in the eruption of a geyser, which is merely a small water volcano. The water basin of a geyser is connected by a natural bore with a region of great internal heat, and as fast as the heat turns the water into steam, columns of steam and hot water are thrown up from the crater.

One form of volcanic eruption, and its simplest form, is likewise illustrated in a boiler explosion. Observations of the most violent volcanic eruptions show them to be only tremendous boiler explosions at a great depth beneath the earth's surface, where a great quantity of water has been temporarily imprisoned and suddenly converted into steam. In minor eruptions the presence of steam is not noticeable in such quantities, which is simply because the amount of imprisoned water was small and the amount of steam generated was only sufficient to expel the volcanic dust and ashes which formed between the earth's surface and the internal fires of the volcano. The flow of lava which follows violent eruptions is expelled by the outward and upward force of the great internal heat, through the opening made by the steam which precedes it

The two lines of volcanoes, one north and south, the other east and west, which intersect in the neighborhood of the West Indies, follow the courses where the crust of the earth is thinnest and where great bodies of water lie on the shallowest parts of the ocean bed.

The terrific heat of the earth's internal fires is sufficient to cause crevices leading from these bodies of water to the central fires of the volcano, and the character of the volcanic eruption is determined largely by the size of the crevices so created and the amount of water which finds its way through them. The temperature of these internal fires can only be guessed at, but some idea may be formed of their intense heat from the streams of lava emitted from the volcano. These will sometimes run ten or twelve miles in the open air before cooling sufficiently to solidify. From this it will be seen that the fires are much hotter than are required merely to reduce the rock to a liquid form. From this fact, too, may be seen the instantaneous action by which the water seeping or flowing into the volcano's heart is converted into steam and a tremendous explosive power generated.

The calamity which befell Martinique and St. Vincent will unquestionably lead to a fresh discussion of the causes of volcanic disturbance. Not all of the phenomena involved therein are yet fully understood, and concerning some of them there are perceptible differences of opinion among experts. On at least one point, however, there is general agreement. At a depth of about thirty miles the internal heat of the earth is probably great enough to melt every known substance. Confinement may keep in a rigid condition the material which lies beneath the solid crust, but if an avenue of escape is once opened the stuff would soften and ooze upward. There is a growing tendency, moreover, to recognize the importance of gravitation in producing eruptions. The weight of several miles of rock is almost inconceivable, and it certainly ought to compel "potentially plastic" matter to rise through any crev-

ice that might be newly formed. Russell, Gilbert and some other authorities regard this as the chief mechanical agent in an eruption, at least when there is a considerable outpouring of lava.

As to the extent to which water operates there is some lack of harmony among volcanists. Shaler, Milne and others hold that substance largely, if not entirely, responsible for the trouble. They point to the fact that many volcanoes are situated near the coast of continents or on islands, where leakage from the ocean may possibly occur. Russell, on the other hand, regards water not as the initial factor, but as an occasional, though important, reinforcement. He suspects that when the molten rock has risen to a considerable distance it encounters that fluid, perhaps in a succession of pockets, and that steam is then suddenly generated. The explosive effects which ensue are of two kinds. By the expansion of the moisture which some of the lava contains the latter is reduced to a state of powder, and thus originate the enormous clouds of fine dust which are ejected. Shocks of greater or less violence are also produced. The less severe ones no doubt sound like the discharge of artillery and give rise to tremors in the immediate vicinity. In extreme cases enough force is developed to rend the walls of the volcano itself. Russell attributes the blowing up of Krakatoa to steam. The culminating episode of the Pelee eruption, though not resulting so disastrously to the mountain, would seem to be due to the same immediate cause. To this particular explosion, too, it seems safe to assign the upheaval which excited a tidal wave.

The precise manner in which the plastic material inside of the terrestrial shell gets access to the surface, is not entirely clear. Nevertheless, it is possible to get some light on the matter. It is now well known that in many places there are deep cracks, or "faults," in the earth's crust. Some of them in the remote past have been wide and deep enough to admit molten material from below. The Palisades of the Hudson

are believed to have been formed by such an intrusion, the adjacent rock on the eastern face having since been worn away by the weather or other agents. It has been observed that many volcanoes are distributed along similar faults.

The existence of a chain of volcanic islands in the West Indies suggests the probability that it follows a crack of great antiquity, though the issue of lava and ashes for several centuries may have been limited to a few isolated points. Just how these vents have been reopened is one of the most difficult questions still left for investigation. Given a line of weakness in the rocks, though, and a susceptibility to fresh fracture is afforded. Professor McGee suggests that the overloading of the ocean bed by silt from the Mississippi river or other sources may have been the immediately exciting cause of the recent outbreaks. Other geologists have found a similar explanation acceptable in the case of eruptions elsewhere. The theory has much to commend it to favor.

The Martinique disaster already has drawn from geologists and volcanists many expressions of opinion, and explanations of volcanic phenomena which set forth in detail the causes and effects of volcanic eruptions, in particular, and seismic convulsions, in general.

Dr. A. R. Crook, a professor in Northwestern University, has made a special study of volcanoes. He has made an ascent of the two highest in the world, and has climbed many others for purposes of study. He is an authority upon volcanography.

"There are two great circles of volcanoes about the earth," said Professor Crook. "One girdles the earth north and south, extending through Tierra del Fuego (called 'land of fire' because of its volcanoes), Mexico, the Aleutian islands and down through Australia; the other east and west through Hawaii, Mexico, West Indies, Italy (including Mount Vesuvius and Asia Minor.

'These two circles intersect at two points. One of these is

the West Indies, which include Martinique, the scene of this terrible disaster; the other is in the islands of Java, Borneo and Sumatra. On the latter islands there are extinct volcanoes. On the former is the terrible Pelee. It is just at these points of intersection of the two volcanic rings that we expect unusual volcanic activity, and it is there that we find it.

"There has been more or less theorizing as to volcanic disturbances moving in cycles, but it cannot be proved. One fact is established, and that is that a volcano is an explosion caused by water coming in contact with the molten mass below the surface of the earth. This is proved by the great clouds of steam that accompany the action.

"The old theory that the very center of the earth is a molten mass," he says, "is no longer held." He asserts the latest idea is that the center of the earth is more rigid than glass, though less rigid than steel. About this there is more or less molten matter, and over all the surface crust of the earth. This molten matter causes the surface of the earth to give, to sag, and form what is called "wrinkling." When water comes in contact with the heated mass an explosion follows that finds its outlet through the places where there is least resistance, and the result is a volcano.

"There is no part of the earth's surface which is exempt from earthquakes," said Professor Crook, "and there is no regularity in their appearance. Volcanic eruptions are almost always preceded by earthquakes somewhere in the circle. Recently there were earthquakes in the City of Mexico in which many lives were lost. As it is impossible to predict when the next will take place, it is also impossible to tell where it will be. It will certainly be somewhere in the line of the two circles.

"All this is of interest as showing that the earth is still in process of formation just as much as it was a billion years ago. We see the same thing in Yellowstone Park. There most decided changes have taken place even in the last eight years.

Old Faithful, which used to play regularly every sixty minutes, now does so only once in twice the time."

With reference to contributions to science, which might be expected from investigations at Martinique, Professor Crook said:

"Even new elements might be discovered, and seismic theories either confirmed or disproved. A volcano always throws off a great variety of materials, hydrochloric and sulphuric acids, iron, silica (sand), sulphur, calcium and magnesium. The lava is of two kinds. That which is easily fusible flows more rapidly than a horse can trot. A more viscous kind cools into shapes like ropes. The latter is common in Hawaii.

"The danger of living in proximity to a volcano is usually well known, but the iron oxides render the soil extremely fertile. This is seen in Sicily about Ætna and Vesuvius. It is seen also in Martinique, where an area of forty miles square was occupied by 160,000 people.

"Owing to the presence of the fumes of chlorine it is probable that many of the victims in St. Pierre were asphyxiated, and so died easily. Others doubtless were buried in ashes, like the Roman soldier in Pompeii, or were caught in some enclosed place which being surrounded by molten lava resulted in slow roasting. It is indeed a horrible disaster and one which we may well pray not to see duplicated. Science, however, has no means of knowing that it may not occur again."

Professor Robert T. Hill, of the United States Geological Survey, who visited the French West Indies on a tour of scientific inspection, says:

"Across the throat of the Caribbean extends a chain of islands which are really smoldering furnaces, with fires banked up, ever ready to break forth at some unexpected and inopportune moment. This group, commencing with Saba, near Porto Rico, and ending with Grenada, consists of ancient ash heaps, piled up in times past by volcanic action. For nearly

one hundred years there has been not the slightest sign of explosion and we had grown to class these volcanoes as extinct.

"Volcanism is still one of the most inexplicable and profound problems which defy the power of geologists to explain, and one of its most singular peculiarities is the fact that it sometimes breaks forth simultaneously in widely distant portions of the earth. A sympathetic relation of this kind has long been known between Hecla and Vesuvius, and it is very probable that the Carib volcanoes have some such sympathetic relation with the volcanoes of Central America and southern Mexico. At the time of the explosion of St. Vincent other explosions preceded or followed it in northern South America and Central America.

"The outburst of Mount Pelee, in Martinique, is apparently the culmination of a number of recent volcanic disturbances which have been unusually severe. Colima, in Mexico, was in eruption but a few months previous, while Chelpancingo, the capital of the State of Guerrero, was nearly destroyed by earthquakes which followed.

"Only a few days before Mount Pelee erupted, the cities of Guatemala were shaken down by tremendous earthquakes."

Professor N. S. Shaler, of Harvard University, a world authority on volcanic disturbances, says:

"Volcanic outbreaks are merely the explosion of steam under high pressure—steam which is bound in rocks buried underneath the surface of the earth and there subjected to such tremendous heat that when the conditions are right its pent up energy breaks forth, and it shatters its stone prison walls into dust.

"The common belief is that water enters the rocks during the crystallization period, and that these rocks, through the natural action of rivers and streams, become deposited in the bottom of the ocean. Here they lie for many ages, becoming buried deeper and deeper under masses of like sediment,

which are constantly being washed down upon them from above. This process is called the blanketing process.

"When the first layer has reached a depth of a few thousand feet the rocks which contain the water of crystallization are subjected to a terrific heat. This heat generates steam, which is held in a state of frightful tension in its rocky prison.

"It is at these moments that volcanic eruptions occur. They result from wrinkling in the outer crust of the earth's surface—wrinklings caused by the constant shrinking of the earth itself and by the contraction of the outer surface as it settles on the plastic center underneath. Fissures are caused by these foldings, and as these fissures reach down into the earth the pressure is removed from the rocks and the compressed steam in them and it explodes with tremendous force.

"The rocks containing the water are blown into dust which sometimes is carried so high as to escape the power of the earth's attraction and float by itself through space. After the explosions have occurred lava pours forth. This is merely melted rock which overflows like water from a boiling kettle. But the explosion always precedes the flow, and one will notice that there is always an outpouring of dust before the lava comes."

Professor W. J. McGee, of the Smithsonian Institution at Washington, says: "It may be that a violent earthquake tremor came after the volcanic eruption, but it does not necessarily follow that the two travel together. Oftentimes we hear of earth tremors with no apparent accompaniment. This was true of the Charleston earthquake in 1886. Earthquakes are caused by mysterious disturbances in the interior of the earth. The most commonly accepted belief is that massive rock beds away down in the earth, at a depth of twelve miles or more, become disturbed from one cause or another, with the result that the disturbance is felt on the earth's surface, sometimes severely, sometimes faintly.

"Probably the most violent earthquake in history occurred about ten years ago at Krakatoa. The explosion could be

heard for more than one thousand miles, and the earth's tremors were felt for thousands of miles. The air was filled with particles of earth for months afterward. The air-waves following the explosion are believed to have passed two and one-half times around the globe. The face of the land and sea in the vicinity of the eruption was completely changed."

Dr. E. Otis Hovey, professor in the Museum of Natural History, New York, offers the following explanation of the Martinique disaster:

"A majority of volcanic eruptions are similar in cause and effect to a boiler explosion. It is now the accepted belief that sudden introduction of cold water on the great molten mass acts as would the pouring of water into a red hot boiler. It causes a great volume of steam, which must have an outlet. You can readily see how water could get into the crater, located as this one was—on an island, and not far from the coast. The volcanic chains crossed at that point. Such crossing would cause a tension of the crust of the earth, which might cause great fissures. If water were to search out those fissures and reach the great molten mass below it is not hard to imagine what the result would be. There are two classes of volcanoes—those which have explosive eruptions, like Vesuvius and Krakatoa, and this latest one, and those of no explosive nature, like Mauna Loa and Kilauea, in Hawaii, which boil up and flow over. It is the explosive eruption which brings widespread destruction, and it is astonishing to learn of the tremendous power one of those eruptions unleashes."

Professor John Milne, of London, the highest authority in the world on volcanic explosions, classifies eruptions into two grades: Those that build up very slowly. Those that destroy most rapidly.

"The latter are the most dangerous to human life and the physical face of a country. Eruptions that build up mountains are periodical wellings over of molten lava, comparatively harmless. But in this building up, which may cover a period

STREET PILED HIGH WITH DEBRIS. The building on the right is the ruins of the Olympic Club where the famous prize fights were held. This pic ure shows what a tremendous task confronted the authorities when they started to clean the streets after the fire

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SAN FRANCISCO AFTER THE FIRE. All of the large mercantile houses were completely wiped out by the fire. This is a picture of what was left of Hale's big store.

of centuries, natural volcanic vents are closed up and gases and blazing fires accumulate beneath that must eventually find the air. Sooner or later they must burst forth, and then the terrific disasters of the second class take place. It is the same cause that makes a boiler burst."

Professor Milne was asked after Krakatoa's performance:

"Is it likely that there are volcanoes in the world at present that have been quiet for a long time but will one day or another blow their heads off?"

"It is almost certain there are."

"Some in Europe?"

"Many in Europe."

"Some in the United States?"

"Undoubtedly."

Mount Pelee of Martinique has verified the eminent authority's word.

Professor Angelo Heilprin, of Philadelphia, the eminent geologist and authority on volcanology, declares there is danger that all the West Indian reef islands will collapse and sink into the sea from the effects of the volcanic disturbances now in progress. More than that, he says, the Nicaraguan canal route is in danger because it is in the eruption zone.

"In my opinion the volcano eruptions are not the only things to be feared," he continued. "It is altogether likely that the volcanic disturbance now going on may result in the collapse of the islands whose peaks spring into activity. The constant eruptions of rock, lava, and ashes, you must know, mean that a hole, as it were, is being made in the bosom of the earth. When this hole reaches a great size, that which is above will be without support, and then subsidence must follow. The volcanoes of Martinique and St. Vincent, and of the neighboring islands of the Caribbean, are situated in a region of extreme weakness of the earth's crust, which has its parallel in the Mediterranean basin on the opposite side of the Atlantic. This American region of weakness extends westward

from the Lesser Antilles across the Gulf of Mexico into Mexico proper, where are located some of the loftiest volcanoes of the globe, Popocatepetl and Orizaba, both now in somnolent condition, and including the more westerly volcano of Colima, which has been almost continuously in eruption for ten years.

"This same region of weakness includes nearly the whole of Central America. Volcanoes in Costa Rica, Nicaragua, and Guatemala have been repeatedly active, some almost to the present time, many with destructive effect, and it should be no surprise to have some of them burst out with the same vigor and intensity as Mount Pelee or the Soufriere."

The National Geographic Society sent three geographers to make a special study of the eruptions in Martinique and St. Vincent: Professor Robert T. Hill of the United States Geological Survey; Professor Israel C. Russell of Ann Arbor, Mich., and C. E. Borchgrevink, the noted Antarctic explorer.

Professor Hovey, after a careful examination of the desolated areas in Martinique and St. Vincent, related important scientific phases of the great eruptions. Speaking first of the work of his companions and himself in St. Vincent, he said:

"Collection of data concerning the eruption of La Soufriere was immediately begun. The history of the eruption is practically that of the disturbance of 1851. Earthquakes occurred here about a year ago, and have occurred at intervals at various places in the West Indies and adjacent regions ever since. At least one resident of Kingstown—F. W. Griffiths—several months ago predicted that La Soufriere would soon break out.

"Finally, on the day of the great eruption, a vast column of volcanic dust, cinders, blocks of lava and asphyxiating gases rose thousands of feet into the air, spreading in all directions. A large portion of this, having reached the upper current, was carried eastward. This, falling, was again divided, and the cinders and deadly gases were swept by the lower winds back upon the eastward side of the mountain. The

wrecked houses show this, the windows on the side toward the crater being unaffected, while those on the farther side were wrecked by the back draught up the mountain.

"There was no wind on the morning of the great outburst, a fact which facilitated the devastation of the country. The hot, asphyxiating gases rolled out of the crater, and many were scorched and suffocated. Hot mud falling from the cloud above stuck to the flesh of the unfortunate victims, causing bad wounds. Great blocks of stone were thrown out of the eastern side of the crater, which could be distinctly seen at a distance of four miles."

Concerning the eruption of Mount Pelee, Mr. Hovey said: "An increase in the temperature of the lake in the old crater of Pelee was observed by visiting geologists as much as two years ago, while hot springs had long been known to exist near the western base of the mountain and four miles north of St. Pierre. The residents of Martinique, however, all considered the volcano extinct in spite of the eruption fifty-one years ago. The ground around the crater of Pelee was reported in 1901 to consist of hot mud, showing that the increase of temperature observed eighteen months earlier had continued.

"Soon after the middle of April, this year, manifestations of renewed activity were more pronounced. Ashes began to fall in St. Pierre and heavy detonations were heard. The houses of the city shook frequently, suffocating gases filled the air at intervals, and the warning phenomena increased until they became very alarming.

"The Guerin sugar factory, on Riviere Blanche, was overwhelmed on May 5 by a stream of liquid mud, which rushed down the west slope of the mountain with fearful rapidity. The pretty lake which occupied the crater of 1851, on the southwest slope of the cone, about a mile from the extreme summit and a thousand feet below it, had disappeared, and a new crater had formed on its site, spreading death and destruction on all sides. Three days later the eruption took place and

devastated the city of St. Pierre, wiping out the inhabitants and changing a garden spot to a desert.

"A vast column of steam and ashes rose to a height of four miles above the sea, as measured by the French artillerymen at Fort de France. After this eruption the mountain quieted somewhat, but burst forth again at 5:15 o'clock on the morning of May 20. This explosion was more violent than that which destroyed St. Pierre.

"On this occasion the volume of steam and ashes rose to a height of seven miles, according to measurements made by Lieutenant McCormick. An examination of the stones which fell at Fort de France showed them to be of a variety of lava called hornblende and andesite. They were bits of the old lava forming a part of the cone. There was no pumice shown to me, but the dust and lapilli all seemed to be composed of comminuted old rock.

"It is evident that the tornado of suffocating gas which wrecked the buildings asphyxiated the people, then started fire, completing the ruin. This accords with the statement which has been made that asphyxiation of the inhabitants preceded the burning of the city. The gas being sulphureted hydrogen, was ignited by lightning or the fires in the city. The same tornado drove the ships in the roadstead to the bottom of the sea or burned them before they could escape.

"Mud was formed in two ways—by the mixture in the atmosphere of dust and condensed steam and by cloudbursts on the upper dust-covered slopes of the cone washing down vast quantities of fine light dust. No flow of lava apparently has attended the eruption as yet, the purely explosive eruptions thus far bringing no molten matter to the surface. The great emission of suffocating gas and the streams of mud are among the new features which Pelee has added to the scientific knowledge of volcanoes."

Professor Hill was the first man who set foot in the area of craters, fissures, and fumaroles, and, because of his high

position as a scientist, his story was valuable. He reported as follows: "There were three well marked zones: First, a center of annihilation, in which all life, vegetable and animal, was utterly destroyed—the greater northern part of St. Pierre was in this zone; second, a zone of singeing, blistering flame, which also was fatal to all life, killing all men and animals, burning the leaves on the trees, and scorching, but not utterly destroying, the trees themselves; third, a large outer, non-destructive zone of ashes, wherein some vegetation was injured.

"The focus of annihilation was the new crater midway between the sea and the peak of Mount Pelee where now exists a new area of active volcanism, with hundreds of fumaroles or miniature volcanoes. The new crater is now vomiting black, hot mud, which is falling into the sea. Both craters, the old and the new, are active.

"The destruction of St. Pierre was due to the new crater. The explosion had great superficial force, acting in radial directions, as is evidenced by the dismounting and carrying for yards the guns in the battery on the hill south of St. Pierre and the statue of the Virgin in the same locality, and also by the condition of the ruined houses in St. Pierre. According to the testimony of some persons there was an accompanying flame. Others think the incandescent cinders and the force of their ejection were sufficient to cause the destruction. This must be investigated. I am now following the nature of this."

Professor Hill started on Monday, May 26, to visit the vicinity of Mount Pelee, and returned to Fort de France Wednesday morning, nearly exhausted. Professor Hill was near the ruins of St. Pierre on Monday night during the series of explosions from Mount Pelee, and was able to describe the volcanic eruption from close observation. Speaking personally of his expedition he said: "My attempt to examine the crater of Mount Pelee has been futile. I succeeded, however, in getting close to Morne Rouge. At seven o'clock on Monday night I

witnessed, from a point near the ruins of St. Pierre, a frightful explosion from Mount Pelee and noted the accompanying phenomena. While these eruptions continue, no sane man should attempt to ascend to the crater of the volcano. Following the salvos of detonations from the mountain, gigantic mushroom-shaped columns of smoke and cinders ascended into the clear, starlit sky, and then spread in a vast black sheet to the south and directly over my head. Through this sheet, which extended a distance of ten miles from the crater, vivid and awful lightning-like bolts flashed with alarming frequency. They followed distinct paths of ignition, but were different from lightning in that the bolts were horizontal and not perpendicular. This is indisputable evidence of the explosive oxidation of the gases after they left the crater. This is a most important observation and explains in part the awful catastrophe. This phenomenon is entirely new in volcanic history.

"I took many photographs, but do not hesitate to acknowledge that I was terrified. But I was not the only person so frightened. Two newspaper correspondents, who were close to Morne Rouge some hours before me, became scared, ran three miles down the mountain, and hastened into Fort de France. The people on the north end of the island are terrified and are fleeing with their cattle and effects. I spent Tuesday night in a house at Deux Choux with a crowd of 200 frightened refugees.

"Nearly all the phenomena of these volcanic outbreaks are new to science, and many of them have not yet been explained. The volcano is still intensely active, and I cannot make any predictions as to what it will do."

CHAPTER XXIV

TERRIBLE VOLCANIC DISASTERS OF THE PAST

BY TRUMBULL WHITE.

Destruction of Sodom and Gomorrah and the Other Cities of the Plain—The Bible Account a Graphic Description of the Event—Ancient Writers Tell of Earthquakes and Volcanoes of Antiquity—Discovery of Buried Cities of which no Records Remain—Formation of the Dead Sea—The Valley of the Jordan and Its Physical Characteristics.

IN the history of earthquakes, nothing is more remarkable than the extreme fewness of those recorded before the beginning of the Christian era, in comparison with those that have been registered since that time. This may be partly accounted for by the fact that before the birth of Christ, there was but a small portion of the habitable surface of the globe known to those who were capable of handing down a record of natural events. The vast increase in the number of earthquakes in recent times is, therefore, undoubtedly due to the enlargement of our knowledge of the earth's surface, and to the greater freedom of communication now subsisting among mankind.

Earthquakes might have been as frequent throughout the entire globe in ancient times as now; but the writers of the Bible, and the historians of Greece and Rome might have known nothing of their occurrence. Even at the present time, an earthquake might happen in Central Africa, or in Central Asia, of which we would never hear, and the recollection of which might die out among the natives in a few generations. In countries, too, which are thinly inhabited, and where

there are no large cities to be overthrown, even great earthquakes might happen almost unheeded. The few inhabitants might be awe-struck at the time; but should they sustain no personal harm, the violence of the commotion and the intensity of their terror would soon fade from their memories.

Dr. Daubeny, in his work on volcanoes, cites an example of this complete oblivion, even when the event must have occurred not far from the ancient center of civilization. The town of Lessa, between Rome and Naples, and not far from Gaeta, stands on an eminence composed of volcanic rocks. In digging the foundations for a house at this place some years ago, there were discovered, many feet beneath the present surface, a chamber with antique frescoes and the remains of an amphitheater. Yet there is not only no existing account of the destruction of a town on this site, but not even a tradition of any volcanic eruption in the neighborhood.

The earthquake which destroyed Sodom and Gomorrah is not only the oldest on record, but one of the most remarkable. It was accompanied by a volcanic eruption, it upheaved a district of several hundred square leagues, and caused the subsidence of a tract of land not less extensive, altering the whole water system and the levels of the soil. The south of Palestine contained a splendid valley dotted with forests and flourishing cities. This was the valley of Siddim, in which reigned the confederate sovereigns of Sodom, Gomorrah, Adniah, Zeboiim and Zoar. They had joined forces to resist the king of the Elamites, and they had just lost the decisive battle of the campaign when the catastrophe which destroyed the five cities and spread desolation in the flourishing valley took place. As the sun arose, the ground trembled and opened, red-hot stones and burning cinders, which fell like a storm of fire upon the surrounding country, being emitted from the yawning chasm.

In a few words, the Bible relates the dread event:

"And when the morning arose, the angels hastened Lot,

saying, Arise, take thy wife, and thy two daughters, which are here, lest thou be consumed in the iniquity of the city.

"And while he lingered, the men laid hold upon his hand, and upon the hand of his wife, and upon the hand of his two daughters, the Lord being merciful unto him, and they brought him forth and set him without the city.

"And it came to pass, when they had brought them forth abroad, that he said, Escape for thy life; look not behind thee, neither stay thou in all the plain; escape to the mountain lest thou be consumed.

"And Lot said unto them, Oh, not so, my Lord, behold now, thy servant hath found grace in thy sight, and thou hast magnified thy mercy, which thou hast shewed unto me in saving my life; and I cannot escape to the mountain, lest some evil take me, and I die. Behold now, this city is near to flee unto, and it is a little one: Oh, let me escape thither, (is it not a little one?) and my soul shall live.

"And he said unto him, See, I have accepted thee concerning this thing also, that I will not overthrow this city, for which thou hast spoken. Haste thee, escape thither; for I cannot do anything until thou be come thither.

"Therefore the name of the city was called Zoar. The sun was risen upon the earth when Lot entered into Zoar.

"Then the Lord rained upon Sodom and upon Gomorrah brimstone and fire from the Lord out of heaven. And he overthrew those cities, and all the plain, and all the inhabitants of the cities, and that which grew upon the ground.

"But his wife looked back from behind him, and she became a pillar of salt.

"And Abraham got up early in the morning to the place where he stood before the Lord, and he looked toward Sodom and Gomorrah, and toward all the land of the plain, and beheld, and lo, the smoke of the city went up as the smoke of a furnace."

Nothing could be more succinct or terse than this descrip-

tion of the catastrophe. This was a sudden volcanic eruption like that which destroyed in one night the cities of Pompeii and Herculaneum. At the time of the convulsion in Palestine while clouds of ashes were emitted from the yawning abyss and fell in fiery showers upon the ground, a vast tract of country, comprising the five cities and some land to the south of them, was violently shaken and overturned.

Of the valleys watered by the Jordan, that of Siddim was the largest and the most populous. All the southern part of this valley, with its woods, its cultivated fields, and its broad river, was upheaved. While upon the other side the plain subsided, and for a distance of a hundred leagues was transformed into a vast cavern of unknown depth. Upon that day the waters of the Jordan, suddenly arrested by the upheaval of the soil lower down the stream, must have flowed rapidly back toward their source, again to flow not less impetuously along their accustomed incline, and to fall into the abyss created by the subsidence of the valley and the break-up of the bed of the stream.

When, after the disaster, the inhabitants of neighboring regions came to visit the scene of it, they found the whole aspect of the district altered. The valley of Siddim had ceased to exist, and an immense sheet of water covered the space which it once occupied. Beyond this vast reservoir, to the south, the Jordan, which formerly fertilized the country as far as the Red Sea, had also disappeared. The whole country was covered with lava, ashes and salt; all the cultivated fields, the hamlets and villages, had been involved in the cataclysm.

The record of this great catastrophe is preserved not only by Scripture, but by the living and spoken traditions of the East, all the legends of Syria, as well as ancient historians like Tacitus and Strabo, relating how Lake Asphaltite was formed during the terrible shock and how opulent cities were swal-

lowed up in the abyss or destroyed by fire from out of the earth.

But even if popular traditions had been forgotten, and if the writings of ancient authors had been lost, the very aspect of the country would suffice to show that it had suffered from some terrible subterranean convulsion. As it was upon the morrow of the catastrophe itself, so it has remained with its calcined rocks, its blocks of salt, its masses of black lava, its rough ravines, its sulphurous springs, its boiling waters, its bituminous marshes, its riven mountains, and its vast Lake Asphaltite, which is the Dead Sea.

This sea, the depth of which has never been sounded, evokes by its origin and its mysterious aspect, the dolorous image of death. Situated about 690 feet below the level of the ocean, in the depression of the soil caused by the earthquake, its waters extend over an area of a hundred square leagues to the foot of the salt mountains and basaltic rocks which encircle it. One can detect no trace of vegetation or animal life; not a sound is heard upon its shores, impregnated with salt and bitumen; the birds avoid flying over its dreary surface from which emanate deadly effluvia, and nothing can exist in its bitter, salt, oily, and heavy waters. Not a breeze ever stirs the surface of this silent sea, nothing moves therein save the thick load of asphalt which now and again rises from the bottom to the surface and floats lazily on to the desolate strand.

The Jordan has remained what it was in ancient times, the blessed stream, the vivifying artery of Palestine. Taking their source in the spotless snows and pure springs of Mount Hermon, its waters have retained the azure hues of the sky and the clearness of crystal. Before the catastrophe, the Jordan, after having traversed and fertilized Palestine, found its way into the Gulf of Arabia, but now, as upon the morrow of the shock which broke up its bed, its waters are lost in the somber abyss of the Dead Sea.

The Bible mentions an earthquake in Palestine in the reign of Ahab, and one in the reign of Uzziah, which rent the temple. The latter was an event so great that the chroniclers of the time used it in dating occurrences, and Amos speaks of what happened "two years before the earthquake."

The same convulsions of nature are mentioned many other times in the Bible, in connection with prophecy, revelation and the crucifixion.

Nearly all writings about earthquakes prior to the last century tended to cultivate superstitious notions respecting them. Even Pliny, Herodotus, Livy, and the other classic writers, were quite ignorant of the true causes, and mythology entered into their speculations. In later times the investigation has become a science. The Chinese were pioneers in this direction, having appointed an Imperial Commission in A.D. 136 to inquire into the subject. It is to be doubted, however, if what they reported would be considered as of much scientific value to-day.

By this time it is estimated that in the libraries of the world are more than 2,000 works treating of earth-motions. The phenomena are taken quite out of the realm of superstition. By means of delicate instruments of various kinds, called seismometers, the direction of earth-movements can be traced, and their force gauged, while by means of a simple magnet with a metal piece attached to it, an earthquake can be foretold. These instruments tell us that scarcely a day passes without an earthquake in some portion of the globe. The internal causes of these manifestations are ever active, whatever the causes may be.

CHAPTER XXV

VESUVIUS AND THE DESTRUCTION OF POMPEII

BY TRUMBULL WHITE.

Most Famous Volcanic Eruption in History—Roman Cities Overwhelmed—Scenes of Horror Described by Pliny, the Great Classic Writer, an Eye-Witness of the Disaster—Buried in Ashes and Lava—The Stricken Towns Preserved for Centuries and Excavated in Modern Times as a Wonderful Museum of the Life of 1800 Years Ago.

MOUNT VESUVIUS, the world-famed volcano of southern Italy, seen as it is from every part of the city of Naples and its neighborhood, forms the most prominent feature of that portion of the frightful and romantic Campanian coast. For many centuries it has been an object of the greatest interest, and certainly not the least of the many attractions of one of the most notable cities of Europe. Naples, with its bay constitutes as grand a panorama as any to be seen in the world. The mountain is a link in the historical chain which binds us to the past, which takes us back to the days of the Roman Empire. Before the days of Titus it seems to have been unknown as a volcano, and its summit is supposed to have been crowned by a temple of Jupiter.

In the year 25 A.D., Strabo, an eminent historian of the time, wrote: "About these places rises Vesuvius, well cultivated and inhabited all round, except at its top, which is for the most part level, and entirely barren, ashy to the view, displaying cavernous hollows in cineritious rocks, which look as if they had been eaten by fire; so that we may suppose this spot to have been a volcano formerly, with burning craters, now extinguished for want of fuel."

Though Strabo was a great historian, it is evident that he

was not a prophet. The subsequent history of Vesuvius has shown that at varying periods the mountain has burst forth in great eruptive activity.

Herculaneum was a city of great antiquity, its origin being ascribed by Greek tradition to Hercules, the celebrated hero of the mythological age of Greece; but it is not certain that it was actually founded by a Greek colony, though in the time of Sulla, who lived a hundred years before Christ, it was a municipal and fortified town. Situated on an elevated ground between two rivers, its position could not but be considered important, its port Retina being one of the best on the coast of Campania. Many villas of great splendor were owned in the neighborhood by Roman patricians; Servilia, the mother of Brutus, and the favorite mistress of Julius Caesar, resided here on an estate which he had given to her.

Pompeii, too, was a very ancient city, and was probably founded by a Grecian colony; for what is considered its oldets building, a Greek temple, from its similarity to the Praestum temples, fixes the date of construction with some certainty at about 650 B.C. This temple, by common consent, is stated to have been dedicated to Hercules, who, according to Solonus, landed at this spot with a procession of oxen.

The situation of Pompeii possessed many local advantages. Upon the verge of the sea, at the mouth of the Sarno, with a fertile plain behind, like many an ancient Italian town, it united the conveniences of commerce with the security of a military station. According to Strabo, Pompeii was first occupied by the Oscans, subsequently by the Tyrrhenians and Pelasgians, and afterwards by the Samnites, in whose hands it continued until it came into the possession of the Romans. The delightful position of the city, the genial climate of the locality, and its many attractions, caused it to become a favorite retreat of the wealthier Romans, who purchased estates in the neighborhood; Cicero, among others, having a villa there.

In A.D. 63, during the reign of Nero, an earthquake overthrew a considerable portion of Pompeii and Herculaneum. Scarcely had the inhabitants in some measure recovered from their alarm, and begun to rebuild their shattered edifices, when a still more terrible catastrophe occurred, and the first recorded eruption of Vesuvius, on the 23d of August, A.D. 79, completed the ruin of the two cities.

Of this event we fortunately possess a singularly graphic description by one who was not only an eye-witness, but well qualified to observe and record its phenomena—Pliny, the Younger, whose narrative is contained in two letters addressed to the historian Tacitus. These letters run as follows:

"Your request," he writes, "that I would send you an account of my uncle's death, in order to transmit a more exact relation of it to posterity, merits my acknowledgements; for should the calamity be celebrated by your pen, its memory, I feel assured, will be rendered imperishable. He was at that time, with the fleet under his command, at Misenum. On the 24th of August, about one in the afternoon, my mother desired him to observe a cloud which seemed of unusual shape and dimensions. He had just returned from taking the benefit of the sun, and after a cold water bath and a slight repast, had retired to his study. He immediately arose, and proceeded to a rising ground, from whence he might more distinctly mark this very uncommon appearance.

"At that distance it could not be clearly perceived from what mountain the cloud issued, but it was afterward ascertained to proceed from Mount Vesuvius. I cannot better describe its figure than by comparing it to that of a pine tree, for it shot up to a great height like a trunk, and extended itself at the top into a kind of branches; occasioned, I imagine, either by a sudden gust of air that impelled it, the force of which decreased as it advanced upward, or by the expansion of the cloud itself, when pressed back again by its own weight. Sometimes it appeared bright, and sometimes dark and

spotted, as it became more or less impregnated with earth and cinders. This extraordinary phenomenon excited my uncle's philosophical curiosity to inquire into it more closely. He ordered a light vessel to be got ready for him, and invited me to accompany him if I pleased. I replied that I would rather continue my studies.

"As he was leaving the house, a note was brought to him from Rectina, the wife of Bassus, who was in the utmost alarm at the imminent peril which threatened her; for her villa being situated at the foot of Mount Vesuvius, the only mode of escape was by the sea. She earnestly entreated him, therefore, to hasten to her assistance. He accordingly changed his first design, and what he began out of curiosity, now continued out of heroism. Ordering the galleys to put to sea, he went on board, with an intention of assisting not only Rectina, but several others, for the villas are very numerous along that beautiful shore. Hastening to the very place which other people were abandoning in terror, he steered directly toward the point of danger, and with so much composure of mind that he was able to make and to dictate his observations on the changes and aspects of that dreadful scene.

"He was now so nigh the mountain that the cinders, which grew thicker and hotter the nearer he approached, fell into the vessel, together with pumice-stones and black pieces of burning rock; and now the sudden ebb of the sea, and vast fragments rolling from the mountain, obstructed their nearer approach to the shore. Pausing to consider whether he should turn back again, to which he was advised by his pilot, he exclaimed, 'Fortune befriends the brave: carry me to Pomponianus.'

"Pomponianus was then at Stabiae, separated by a gulf which the sea, after several windings, forms upon the shore. He had already sent his baggage on board; for though not at that time in actual danger, yet being within prospect of it, he was determined, if it drew nearer, to put to sea as soon as the

VIEW SHOWING RUIN LOOKING DOWN MARKET STREET.

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GENERAL VIEW TOWARDS NOB HILL. To the right is the building occupied by the Sons of California, and next to it one of the fine church edifices for which the city was noted, with the ruins of the Fairmount Hotel in the distance.

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wind should change. The wind was favorable, however, for carrying my uncle to Pomponianus, whom he found in the greatest consternation. He embraced him tenderly, encouraging and counselling him to keep up his spirits; and still better to dissipate his alarm, he ordered, with an air of unconcern, the baths to be got ready. After having bathed, he sat down to supper with great cheerfulness, or, what was equally courageous, with all the semblance of it.

"Meanwhile, the eruption from Mount Vesuvius broke forth in several places with great violence, and the darkness of the night contributed to render it still more visible and dreadful. But my uncle, to soothe the anxieties of his friend, declared it was only the burning of the villages, which the country people had abandoned to the flames. After this, he retired to rest; and it is certain he was so little discomposed as to fall into a deep sleep; for being somewhat corpulent, and breathing hard, those who attended without actually heard him snore.

"The court which led to his apartment being nearly filled with stones and ashes, it would have been impossible for him, had he continued there longer, to have made his way out; it was thought proper, therefore, to awaken him. He got up and joined Pomponianus and the rest of his company who were not unconcerned enough to think of going to bed. They consulted together which course would be the more prudent: to trust to the houses, which now shook from side to side with frequent and violent concussions; or to escape to the open country, where the calcined stones and cinders fell in such quantities, as notwithstanding their lightness, to threaten destruction. In this dilemma they decided on the open country, as offering the greater chance of safety; a resolution which, while the rest of the company hastily adopted it through their fears, my uncle embraced only after cool and deliberate consideration. Then they went forth, having pillows tied upon their heads with napkins; and this was their

sole defence against the storm of stones that fell around them.

"It was now day everywhere else, but there a deeper darkness prevailed than in the obscurest night, though it was in some degree dissipated by torches and lights of various kinds. They thought proper to go down further upon the shore, to ascertain whether they might safely put out to sea; but found the waves still extremely high and boisterous. There my uncle, having drunk a draught or two of cold water, flung himself down upon a cloth which was spread for him, when immediately the flames and their precurser, a strong stench of sulphur, dispersed the rest of the company, and compelled him to rise. He raised himself with the assistance of two of the servants, but instantly fell down dead; suffocated, I imagine by some gross and noxious vapor. As soon as it was light again, which was not until the third day after this melancholy accident, his body was found entire, and free from any sign of violence, exactly in the same posture that he fell, so that he looked more like one asleep than dead."

In a second letter to Tacitus, Pliny in relating his own experiences, says:

"Day was rapidly breaking, but the light was exceedingly faint and languid; the buildings all around us tottered; and though we stood upon open ground, yet, as the area was narrow and confined, we could not remain without certain and formidable peril, and we therefore resolved to quit the town. The people followed us in a panic of alarm, and, as to a mind distracted with terror every suggestion seems more prudent than its own, pressed in great crowds about us in our way out.

"As soon as we had reached a convenient distance from the houses, we stood still, in the midst of a perilous and most dreadful scene. The chariots which we had ordered to be drawn out oscillated so violently, though upon level ground, that we could not keep them steady, even by supporting them with large stones. The sea seemed to roll back upon itself,

and to be driven from its strands by the earth's convulsive throes; it is certain, at least, that the shore was considerably enlarged, and that several marine animals were left upon it. On the other side, a black and terrible cloud, bursting with an igneous serpentine vapor, darted out a long train of fire, resembling, but much larger than the flashes of lightning.

"Soon after the black cloud seemed to descend and enshroud the whole ocean; as, in truth, it entirely concealed the island of Caprea and the headland of Misenum. The ashes now began to fall upon us, though in no considerable quantity. Turning my head, I perceived behind us a dense smoke, which came rolling in our track like a torrent. I proposed, while there was yet some light, to diverge from the highroad, lest my mother should be crushed to death in the dark by the crowd that followed us. Scarcely had we stepped aside when darkness overspread us; not the darkness of a cloudy night, or when there is no moon, but that of a chamber which is close shut, with all the lights extinct.

"And then nothing could be heard but the shrieks of women, the cries of children, and the exclamations of men. Some called aloud for their little ones, others for their parents, others for their husbands, being only able to distinguish persons by their voices; this man lamented his own fate, that man the fate of his famly; not a few wished to die out of very fear of death; many lifted their hands to the gods; but most imagined the last eternal night was come, which should destroy the world and the gods together.

"At length, a glimmer of light appeared, which we imagined to be rather the foretoken of an approaching burst of flames, as in truth it was, than the return of day. The fire, however, having fallen at a distance from us, we were again immersed in dense darkness, and a heavy shower of ashes fell upon us, which we were compelled at times to shake off—otherwise we should have been crushed and buried in the heap.

"After a while, this dreadful darkness gradually disap-

peared like a cloud of smoke; the actual day returned, and with it the sun, though very faintly, and as when an eclipse is coming on. Every object that presented itself to our eyes (which were extremely weakened) seemed changed, being covered with a crust of white ashes, like a deep layer of snow. We returned to Misenum, where we refreshed ourselves as well as we could, and passed an anxious night between hope and fear, though, indeed, with a much larger share of the latter; for the earthquake still continued, while several excited individuals ran up and down, augmenting their own and their friends' calamities by terrible predictions."

The graphic accounts of Pliny the Younger have been confirmed in every respect by scientific examination of the buried cities. The eruption was terrible in all its circumstances—the rolling mud, the cloud of darkness, the flashes of electric fire, the shaking earth—but yet more terrible in its novelty of character and the seemingly wide range of its influence. These combined causes would appear to have exercised a fatal effect on the Pompeians, and but for them nearly all might have escaped. Thus, the amphitheatre was crowded when the catastrophe occurred, but only two or three skeletons have been found in it, which probably were those of gladiators already killed or wounded. The bold, the prompt, and the energetic saved themselves by immediate flight; those who lingered through love or avarice, supine indifference, or palsying fear, perished.

Many sought refuge in the lower rooms or underground cellars of their houses, but there the steaming mud pursued and overtook them. Had it been otherwise, they must have died of hunger or suffocation, as all avenues of egress were absolutely blocked up.

It is impossible to exaggerate the horrors of the last day of the doomed city. The rumbling of the earth beneath; the dense obscurity and murky shadow of the heaven above; the long, heavy roll of the convulsed sea; the strident noise of the

vapors and gases escaping from the mountain-crater; the shifting electric lights, crimson, emerald green, lurid yellow, azure, blood red, which at intervals relieved the blackness, only to make it ghastlier than before; the hot, hissing showers which descended like a rain of fire; the clash and clang of meeting rocks and riven stones; the burning houses and flaming vineyards; the hurrying fugitives, with wan faces and straining eyeballs, calling on those they loved to follow them; the ashes, and cinders, and boiling mud, driving through the darkened streets, and pouring into the public places; above all, that fine, impalpable, but choking dust which entered everywhere, penetrating even to the lowest cellar, and against which human skill could devise no effectual protection; all these things must have combined into a whole of such unusual and such awful terror that the imagination cannot adequately realize it. The stoutest heart was appalled; the best-balanced mind lost its composure. The stern Roman soldier stood rigidly at his post, content to die if discipline required it, but even his iron nerves quailed at the death and destruction around him. Many lost their reason, and wandered through the city, gibbering and shrieking lunatics. And none, we may be sure, who survived the peril, ever forgot the sights and scenes they had witnessed on that day of doom.

Three days and nights were thus endured with all the anguish of suspense and uncertainty. On the fourth day the darkness, by degrees, began to clear away. The day appeared, the sun shining forth; but all nature seemed changed. Buried beneath the lava lay temple and circus, the tribunal, the shrine, the frescoed wall, the bright mosaic floor; but there was neither life nor motion in either city of the dead, though the sea which once bore their argosies still shimmered in the sunshine, and the mountain which accomplished their destruction still breathed forth smoke and fire.

The scene was changed; all was over; smoke and vapor and showers had ceased, and Vesuvius had returned to its nor-

mal slumber. Pompeii and Herculaneum were no more. In their place was a desolated plain, with no monuments visible, no house to be seen—nothing but a great surface of white ashes, which hardened and petrified, and finally disintegrated into soil upon which, years after, might be seen the fruitful vine, the waving corn, and wild flowers in all their loveliness and beauty, hiding the hideous tragedy of a bygone age.

It was about the middle of the eighteenth century that systematic excavations in the ashes that covered Pompeii began. Since that time the work has been slow, though continuous, and great progress has been made in disinterring the buried city. To-day it is a municipal museum of the Roman Empire as it was 1,800 years ago. The architecture is almost unmarred; the colors of decorated tiles on the walls are still bright; the wheel marks are fresh looking; the picture of domestic life as it was is complete, except for the people who were destroyed or driven from the city. No other place in all the world so completely portrays that period of the past to us as does Pompeii, overwhelmed by Vesuvius, hidden for centuries, and now once more in view to the world to-day.

CHAPTER XXVI

MOUNT ÆTNA AND THE SICILIAN HORRORS

BY TRUMBULL WHITE.

A Volcano with a Record of Twenty-five Centuries—Seventy-eight Recorded Eruptions — Three Hundred Thousand Inhabitants Dwelling on the Slopes of the Mountain and in the Valleys at its Base—Stories of Earthquake Shock and Lava Flows—Tales of Destruction—Described by Ancient and Modern Writers and Eye-witnesses.

MOUNT ÆTNA, one of the most celebrated volcanoes in the world, is situated on the eastern sea-board of Sicily. The ancient poets often alluded to it, and by some it was feigned to be the prison of the giant Euceladus or Typhon, by others the forge of Hephæstus. The flames proceeded from the breath of Euceladus, the thunderous noises of the mountain were his groans, and when he turned upon his side, earthquakes shook the island. Pindar in his first Pythian ode for Hiero of Ætna, winner in the chariot race in 474 B.C., exclaims:—He (Typhon) is fast bound by a pillar of the sky, even by snowy Ætna, nursing the whole year's length her dazzling snow. Whereout pure springs of unapproachable fire are vomited from the inmost depth: in the daytime the lava streams pour forth a lurid rush of smoke, but in the darkness a red rolling flame sweepeth rocks with uproar to the wide, deep sea. Æschylus (525-456 B.C.) speaks also of the "mighty Typhon." Thucydides (471-402 B.C.) alludes in the last lines of his third book to three early eruptions of the mountain. Many other early writers speak of Ætna, among them Theocritus, Virgil, Ovid, Livy, Seneca, Lucan, Strabo, and Lucilius Junior. While the poets on the

one hand had invested Ætna with various supernatural attributes, and had made it the prison of a chained giant, and the workshop of a god, Lucretius and others endeavored to show that the eruptions and other phenomena of the mountain could be explained by the ordinary operations of nature.

If we pass to more modern times we find mention of Ætna by Dante, Petrarch, Cardinal Bembo, and other middle age writers. In 1541 Fazello wrote a brief history of the mountain, and described an ascent. In 1591 Antonio Filoteo, who was born on Ætna, published a work in Venice, in which he describes an eruption which he witnessed in 1536. He asserts that the mountain was then, as now, divided into three "regions"—the first very arid, rugged, uneven, and full of broken rocks; the second covered with forests; and the third cultivated in the ordinary manner.

The great eruption of 1669 was described at length by the naturalist Borelli in the year of its occurrence, and a brief account of it was given by the Earl of Winchelsea, English ambassador at Constantinople, who was returning home by way of the Straits of Messina at the time. As the eruption of 1669 was the most considerable one of modern times, it attracted a great deal of attention, and was described by several eye-witnesses.

The height of Ætna has been often determined. The earlier writers had very exaggerated notions on the subject, and a height of three and even four miles has been assigned. It must be borne in mind that the cone of a volcano is liable to variations in height at different periods, and a diminution of more than three hundred feet has occured during the course of a single eruption of Ætna, owing to the falling of the cone of cinders into the crater. During the last sixty years, however, the height of the mountain has been practically constant at ten thousand eight hundred and seventy-four feet.

There are two cities, Catania and Aci Reale, and sixty-

three towns or villages on Mount Ætna. It is far more thickly populated than any other part of Sicily or Italy. No less than 300,000 people live on the mountain.

A remarkable feature of Ætna is the large number of minor cones which are scattered over its sides. They look small in comparison with the great mass of the mountain, but in reality some of them are of large dimensions.

The best period for making the ascent of Ætna is between June and September, after the melting of the winter snows, and before the falling of the autumnal rains. In winter there are frequently nine or ten miles of snow stretching from the summit downward, the paths are obliterated, and the guides sometimes refuse to accompany travelers. Moreover, violent storms often rage in the upper regions of the mountain, and the wind acquires a force which it is difficult to withstand, and is at the same time piercingly cold.

A list of the eruptions of Ætna from the earliest times has been given by several writers. The first eruption within the historical period probably happened in the seventh century B.C.; the second occurred in the time of Pythagoras. The third eruption, which was in 477 B.C., is mentioned by Thucydides, and it must have been the same eruption to which Pindar and Æschylus allude. An eruption mentioned by Thucydides happened in the year 426 B.C. An outburst of lava took place from Monte di Moja, the most northerly of the minor cones of Ætna, in 396 B.C., and following the course of the river Acesines, now the Alcantara, entered the sea near the site of the Greek colony of Naxos (now Capo di Schiso). We have no record of any further eruption for 256 years, till the year 140 B.C. Six years later an eruption occurred, and the same authorities mention an eruption in the year 126 B.C. Four years later Katana was nearly destroyed by a new eruption. Another, of which we possess no details, occurred during the civil war between Cæsar and Pompey, 49 B.C. Livy speaks of an earthquake which took place in 43 B.C., shortly

before the death of Cæsar, which it was believed to portend. In 38 B.C. and 32 B.C. eruptions took place.

The next eruption of which we hear is that mentioned by Suetonius in his life of Caligula. This was in 40 A.D. An eruption occurred in 72 A.D., after which Ætna was quiescent for nearly two centuries, but in the year 253, in the reign of the Emperor Decius, a violent eruption lasting nine days is recorded. According to Carrera and Photius, an eruption occurred in the year 420. We now find no further record for nearly four hundred years. Geoffrey of Viterbo states that there was an eruption in 812, when Charlemagne was in Messina. After another long interval, in this case of more than three centuries and a half, the mountain again showed activity. In February, 1169, one of the most disastrous eruptions on record took place. A violent earthquake, which was felt as far as Reggio, destroyed Catania in the course of a few minutes, burying fifteen thousand people beneath the ruins. It was the vigil of the feast of St. Agatha, and the cathedral of Catania was crowded with people, who were all buried beneath the ruins, together with the bishops and forty-four Benedictine monks. The side of the cone of the great crater toward Taormina fell into the crater.

There was a great eruption from the eastern side of the mountain in 1181. Lava descended in the same vicinity in 1285. In 1329 Speziale was in Catania, and witnessed a very violent eruption, of which he has left us an account. On the evening of June 28th, about the hour of vespers, Ætna was strongly convulsed, terrible noises were emitted, and flames issued from the south side of the mountain. A new crater, Monte Lepre, opened above the rock of Munsarra, and emitted large quantities of dense black smoke. Soon after a torrent of lava poured from the crater, and red-hot masses of rock were projected into the air. Four years after the last eruption it is recorded by Silvaggio that a fresh outburst took place. A manuscript preserved in the archives of

the cathedral of Catania mentions an eruption which took place on August 6, 1371, which caused the destruction of numerous olive groves near the city. An eruption which lasted for twelve days commenced in November, 1408. A violent earthquake in 1444 caused the cone of the mountain to fall into the great crater. An eruption of short duration, of which we have no details, occurred in 1447; and after this Ætna was quiescent for eighty-nine years.

Cardinal Bembo and Fazzello mention an eruption which took place toward the close of the fifteenth century. In March, 1536, a quantity of lava issued from the great crater, and several new apertures opened near the summit of the mountain and emitted lava.

A year later, in May, 1537, a fresh outburst occurred. A number of new mouths were opened on the south slope near La Fontanelle, and a quantity of lava burst forth which flowed in the direction of Catania, destroying a part of Nicolosi, and St. Antonio. In four days the lava ran fifteen miles. The cone of the great crater suddenly fell in, so as to become level with the Piano del Lago. The height of the mountain was thus diminished by 320 feet. Three new craters opened in November, 1566, on the northeast slope of the mountain. In 1579, 1603, 1607, 1610, 1614, and 1619, unimportant eruptions occurred. In February, 1633, Nicolosi was partly destroyed by a violent earthquake, and in the following December, earthquakes became frequent around the mountain.

In 1646 a new mouth opened on the north-east side, and five years later several new mouths opened on the west side of the mountain and poured out vast volumes of lava which threatened to overwhelm Bronte. We have a more detailed account of the eruption of 1669 than any previous one. It was observed by many men of different nations, and there are a number of narratives regarding it. The eruption was in every respect one of the most terrible on record. On March 8th, the sun was obscured and a whirlwind blew over the face

of the mountain; at the same time earthquakes were felt, and they continued to increase in violence for three days, at the end of which Nicolosi was converted into a heap of ruins.

On the morning of the 11th a fissure nearly twelve miles in length opened in the side of the mountain, and extended from the Piano di St. Leo to Monte Frumento, a mile from the summit. The fissure was only six feet wide, but it seemed to be of unknown depth, and a bright light proceeded from it. Six mouths opened in a line with the principal fissure, and discharged vast volumes of smoke, accompanied by low bellowing, which could be heard forty miles off. Toward the close of the day a crater opened about a mile below the others, and ejected red-hot stones to a considerable distance, and afterward sand and ashes, which covered the country for a distance of sixty miles.

The new crater soon vomited forth a torrent of lava, which presented a front of two miles. It encircled Monpilieri, and afterward flowed towardBelpasso, a town of 8,000 inhabitants, which was speedily destroyed. Seven mouths of fire opened around the new crater, and in three days united with it, forming one large crater 800 feet in diameter. The torrent of lava had continued to flow, and it destroyed the town of Mascalucia on March 23d. On the same day the crater cast up great quantities of sand, ashes, and scoriae, and formed above itself the great double coned hill called Monti Rossi, from the red color of the ashes of which it is mainly composed. On the 25th very violent earthquakes occurred, and the cone of the great central crater was shaken down into the crater for the fifth time since the beginning of the first century A.D. The original current of lava had divided into three streams, one of which destroyed San Pietro, the second Camporotondo, and the third the lands about Mascalucia, and afterward the village of Misterbianco. Fourteen villages were afterward swept out of existence, and the lava made its way toward Catania. At Albanello, two miles from the city, it undermined a hill

covered with corn fields, and carried it forward a considerable distance; a vineyard was also seen floating on its fiery surface.

When the lava reached the walls of Catania, it accumulated without progression until it rose to the top of the wall, sixty feet in height, and it then fell over in a fiery cascade and overwhelmed a part of the city. Another portion of the same stream threw down 120 feet of the wall and carried death and destruction in its course. On April 23d the lava reached the sea, which it entered as a stream 1800 feet broad and forty feet deep. On reaching the sea the water, of course, began to boil violently, and clouds of steam arose, carrying with them particles of scoriae. The volume of lava emitted during this eruption amounted to many millions of cubic feet. Fewara considers that the length of the stream was at least fifteen miles, while its average width was between two and three miles, so that it covered at least forty square miles of surface.

For a few years after this terrible eruption Ætna was quiescent, but in 1682 a new mouth opened on the east side of the mountain, and lava issued from it and rushed down the precipices of the Val del Bue. Early in January, 1693, clouds of black smoke poured from the great crater, and loud noises resembling the discharge of artillery, were heard. A violent earthquake followed, and Catania was shaken to the ground, burying 18,000 of its inhabitants. It is said that in all fifty cities and towns were destroyed in Sicily, together with approximately 100,000 inhabitants.

The following year witnessed another eruption, but no serious disaster resulted. In March, 1702, three mouths opened in the Contrada del Trifaglietto, near the head of the Val del Bue. In 1723, 1732, 1735, 1744, and 1747, slight eruptions occurred. Early in the year 1775 Ætna began to show signs of disturbance; a great column of black smoke issued from the crater, from which forked lightning was frequently emitted. Loud detonations were heard and two streams of lava issued

from the crater. A new mouth opened near Rocca di Musarra in the Val del Bue, four miles from the summit, and a quantity of lava was ejected from it. An extraordinary flood of water descended from Val del Bue, carrying all before it, and strewing its path with large blocks. Recupero estimated the volume of water at 16,000,000 cubic feet, probably a greater amount than could be furnished by the sudden melting of all the winter's snow on the mountain. It formed a channel two miles broad, and in some places thirty-four feet deep, and it flowed at the rate of a mile in a minute and a half during the first twelve miles of its course. The flood was probably produced by the melting not only of the winter's snow, but also of older layers of ice, which were suddenly liquified by the permeation of hot steam and lava, and which had been previously preserved from melting by a deposit of sand and ashes, as in the case of the ancient glacier found near the summit of the mountain in 1828.

In November, 1758, a smart shock of earthquake caused the cone of the great crater to fall in, but no eruption followed. In 1759, 1763, 1766, and 1780, eruptions were noted, and on May 18, 1780, a fissure opened on the southwest side of the mountain and extended from the base of the great crater for seven miles, terminating in a new mouth from which a stream of lava eminated. This encountered the cone of Palmintelli in its course, and separated into two branches, each of which was about 4,000 feet wide. Other mouths opened later in the year, and emitted larger quantities of lava, while in 1781 and 1787 there were slight eruptions. Five years later a fresh outbreak occurred; earthquakes were prevalent, and vast volumes of smoke were carried out to sea, seeming to form a gigantic bridge between Sicily and Africa. A torrent of lava flowed toward Aderno, and a second flowed into the Val del Bue as far as Zuccolaro. A pit called La Cisterna, forty feet in diameter, opened in the Piano del Lago near the great cone, and ejected smoke and masses of old lava saturated with water.

Several mouths opened below the crater, and the country round about Zaffarana was desolated.

In 1797, 1798, 1799, 1800, 1802, 1805, and 1808 slight eruptions occurred. In March, 1809, no less than twenty-one mouths of fire opened between the summit of the mountain and Castiglione, and two years afterward more than thirty mouths opened in a line running eastward from the summit for five miles. They ejected jets of fire, accompanied by much smoke. In 1819 five new mouths of fire opened near the scene of the eruption of 1811; three of these united into one large crater, and poured forth a quantity of lava into the Val del Bue. The lava flowed until it reached a nearly perpendicular precipice at the head of the valley of Calanna, over which it fell in a cascade, and being hardened by its descent, it was forced against the sides of the tufaceous rock at the bottom, so as to produce an extraordinary amount of abrasion, accompanied by clouds of dust worn off by the friction. Mr. Scrope observed that the lava flowed at the rate of about three feet an hour nine months after its emission.

Eruptions occurred in 1831, 1832, 1838, and 1842. Near the end of the following year, fifteen mouths of fire opened near the crater of 1832, at a height of 7,000 feet above the sea. They began by discharging scoriae and sand, and afterward lava, which divided into three streams, the two outer of which soon came to a standstill, while the central stream continued to flow at the rapid rate of 180 feet a minute, the descent being an angle of 25°. The heat at a distance of 120 feet from the current was 90° F. A new crater opened just above Bronte, and discharged lava which threatened the town, but it fortunately encountered Monte Vittoria, and was diverted into another course. While a number of the inhabitants of Bronte were watching the progress of the lava, the front of the stream was suddenly blown out as by an explosion of gunpowder. In an instant red-hot masses were hurled in every direction, and a cloud of vapor enveloped everything. Thirty-

six persons were killed on the spot, and twenty survived but a few hours.

A very violent eruption, which lasted more than nine months, commenced on the 26th of August, 1852. It was first witnessed by a party of six English tourists, who were ascending the mountain from Nicolosi in order to witness the sun rise from the summit. As they approached the Casa Inglesi the crater commenced to give forth ashes and flames of fire. In a narrow defile they were met by a violent hurricane, which overthrew both the mules and the riders, and forced them toward the precipices of Val del Bue. They sheltered themselves beneath some masses of lava, when suddenly an earthquake shook the mountain, and the mules fled in terror. They returned on foot toward daylight to Nicolosi, fortunately without having sustained injury. In the course of the night many rifts opened in that part of Val del Bue called the Balzo di Trifaglietto, and a great fissure opened at the base of Giannicola Grande, and a crater was thrown up, from which for seventeen days showers of sand and scoriae were ejected.

During the next day a quantity of lava flowed down into the Val del Bue, branching off so that one stream flowed to the foot of Mount Finocchio, while the other flowed to Mount Calanna. The eruption continued with abated violence during the early months of 1853, and did not fully cease until May 27th. The entire mass of lava ejected is estimated to be equal to an area six miles long by two miles broad, with an average depth of about twelve feet.

In October, 1864, frequent shocks of earthquake were felt by the dwellers on Ætna. In January, 1865, clouds of smoke were emitted by the great crater, and roaring sounds were heard. On the night of the 30th a violent shock was felt on the northeast side of the mountain, and a mouth opened below Monte Frumento, from which lava was ejected. It flowed at the rate of about a mile a day, and ultimately divided into two streams. By March 10th the new mouths of fire had

increased to seven in number, and they were all situated along a line stretching down from the summit. The three upper craters gave forth loud detonations three or four times a minute. Since 1865, there have been occasional eruptions, but none of great duration, nor has there been any loss of life in consequence.

It will be seen from the foregoing account that there is a great similarity in the general character of the eruptions of Ætna. Earthquakes presage the outburst; loud explosions are heard; rifts open in the sides of the mountain; smoke, sand, ashes, and scoriae are discharged; the action localizes itself in one or more craters; cinders are thrown out and accumulate around the crater in a conical form; ultimately lava rises through the new cone, frequently breaking down one side of it where there is least resistance, and flowing over the surrounding country. Out of the seventy-eight eruptions mentioned above, a comparatively small number have been of extreme violence, while many of them have been of a slight and harmless character.

Italy does not contain a more beautiful or fertile province than Calabria, the celebrated region which the ancients called Magna Grecia, where once flourished Crotona, Tarentum, Sybaris, and so many other prosperous cities. Situated between the volcanoes of Vesuvius and Ætna, Calabria has always been much exposed to the destructive influence of earthquakes, but the most terrible shock ever felt in the province was that of February 5, 1783. The ground was agitated in all directions, swelling like the waves of the ocean. Nothing could withstand such shocks, and not a building upon the surface remained erect. The beautiful city of Messina, the commercial metropolis of Sicily, was reduced to a heap of ruins.

Upon March 4, a fresh shock, almost as violent as the first, completed the work of destruction. The number of persons who perished in Calabria and Sicily during these two earthquakes is estimated at 80,000 and 320 of the 365 towns and vil-

lages which Calabria contained were destroyed. The greater number of those who lost their lives were buried amid the ruins of the houses, but many perished in fires that were kindled in most of the towns, particularly in Oppido, where the flames were fed by great magazines of oil. Not a few, especially among the peasantry dwelling in the country, were suddenly engulfed in fissures. Many who were only half buried in the ruins, and who might have been saved had there been help at hand, were left to die a lingering death from cold and hunger Four Augustine monks at Terranova perished thus miserably. Having taken refuge in a vaulted sacristy, they were entombed in it alive by the masses of rubbish, and lingered for four days, during which their cries for help could be heard, till death put an end to their sufferings.

Of still more thrilling interest was the case of the Marchioness Spadara. Having fainted at the moment of the first great shock, she was lifted by her husband, who, bearing her in his arms, hurried with her to the harbor. Here, on recovering her senses, she observed that her infant boy had been left behind. Taking advantage of a moment when her husband was too much occupied to notice her, she darted off, and, running back to her house, which was still standing, she snatched her babe from his cradle. Rushing with him in her arms toward the staircase, she found the stair had fallen, barring all further progress in that direction. She fled from room to room, chased by the falling materials, and at length reached a balcony as her last refuge. Holding up her infant, she implored the few passers-by for help; but they all, intent on securing their own safety, turned a deaf ear to her cries. Meanwhile her mansion had caught fire, and ere long the balcony, with the devoted lady still grasping her darling, was hurled into the devouring flames.

A few cases are recorded of devotion similar to that of this heroic woman, but happily attended by more fortunate results. In the great majority of instances, however, the instinct of

self-preservation triumphed over every other feeling, rendering the wretched people callous to the dangers and sufferings of others. Still worse was the conduct of the half savage peasantry. They hastened into the towns like vultures to their prey. Instead of helping the sufferers, they ransacked the smoking ruins for plunder, robbed the persons of the dead, and of those entangled alive among the rubbish. They robbed the very injured who would have paid them handsomely for rescuing them. At Polistena, a gentleman had been buried head downward beneath the ruins of his house, and when his servant saw what had happened he actually stole the silver buckles off his shoes, while his legs were in the air, and made off with them. The unfortunate gentleman, however, managed to rescue himself from his perilous position.

Several cases occurred of persons being rescued alive from the ruins after a lapse of three, four, and even five days, and one on the seventh day after interment. Those who were thus rescued all declared that their direst sufferings were from thirst.

CHAPTER XXVII

LISBON EARTHQUAKE SCOURGED

BY TRUMBULL WHITE.

Sixty Thousand Lives Lost in a Few Moments—An Opulent and Populous Capital Destroyed—Graphic Account by an English Merchant Who Resided in the Stricken City—Tidal Waves Drown Thousands in the City Streets—Ships Engulfed in the Harbor—Criminals Rob and Burn—Terrible Desolation and Suffering.

MORE than once in its history has Lisbon, the beautiful capital of Portugal, on the Tagus river, been devastated by earthquakes and tidal waves. Greatest of all these was the appalling disaster of 1755, when in a few minutes thousands upon thousands of the inhabitants were killed or drowned. An English merchant, Mr. Davy, who resided in the ill-fated city at that time, and was an eye-witness of the whole catastrophe, survived the event and wrote to a London friend the following account of it. The narrative reproduced herewith brings the details before the reader with a force and simplicity which leaves no doubt of the exact truth. Mr. Davy wrote as follows:

"On the morning of November 1st I was seated in my apartment, just finishing a letter, when the papers and the table I was writing on began to tremble with a gentle motion, which rather surprised me, as I could not perceive a breath of wind stirring. Whilst I was reflecting with myself what this could be owing to, but without having the least apprehension of the real cause, the whole house began to shake from the very foundation, and a frightful noise came from underground, resembling the hollow, distant rumbling of thunder.

"Upon this I threw down my pen, and started upon my feet, remaining a moment in suspense, whether I should stay in the apartment or run into the street, as the danger in both places seemed equal. In a moment I was stunned with a most horrid crash, as if every edifice in the city had tumbled down at once. The house I was in shook with such violence that the upper stories immediately fell, and though my apartment, which was on the first floor, did not then share the same fate, yet everything was thrown out of its place in such a manner that it was with no small difficulty I kept my feet, and expected nothing less than to be soon crushed to death, as the walls continued rocking to and fro, opening in several places; large stones falling down on every side from the cracks, and the ends of most of the rafters starting out from the roofs.

"To add to this terrifying scene, the sky in a moment became so gloomy that I could now distinguish no particular object; it was an Egyptian darkness indeed, such as might be felt.

"As soon as the gloom began to disperse and the violence of the shock seemed pretty much abated, the first object I perceived in the room was a woman sitting on the floor with an infant in her arms, all covered with dust, pale and trembling. I asked her how she got hither, but her consternation was so great that she could give me no account of her escape. I suppose that when the tremor first began, she ran out of her own house, and finding herself in such imminent danger from the falling stones, retired into the door of mine, which was almost contiguous to hers, for shelter, and when the shock increased, which filled the door with dust and rubbish, she ran upstairs into my apartment. The poor creature asked me, in the utmost agony, if I did not think the world was at an end; at the same time she complained of being choked, and begged me to procure her some water. Upon this I went to a closet where I kept a large jar of water, but found it broken to pieces. I told her she must not now think of quenching her

thirst, but saving her life, as the house was just falling on our heads, and if a second shock came, would certainly bury us both.

"I hurried down stairs, the woman with me, holding by my arm, and made directly to that end of the street which opens to the Tagus. Finding the passage this way entirely blocked up with the fallen houses to the height of their second stories, I turned back to the other end which led to the main street, and there helped the woman over a vast heap of ruins, with no small hazard to my own life; just as we were going into this street, as there was one part that I could not well climb over without the assistance of my hands as well as feet, I desired her to let go her hold, which she did, remaining two or three feet behind me, at which instant there fell a vast stone from a tottering wall, and crushed both her and the child in pieces. So dismal a spectacle at any other time would have affected me in the highest degree, but the dread I was in of sharing the same fate myself, and the many instances of the same kind which presented themselves all around, were too shocking to make me dwell a moment on this single object.

"I now had a long, narrow street to pass, with the houses on each side four or five stories high, all very old, the greater part already thrown down, or continually falling, and threatening the passengers with inevitable death at every step, numbers of whom lay killed before me, or what I thought far more deplorable, so bruised and wounded that they could not stir to help themselves. For my own part, as destruction appeared to me unavoidable, I only wished I might be made an end of at once, and not have my limbs broken, in which case I could expect nothing else but to be left upon the spot, lingering in misery, like those poor unhappy wretches, without receiving the least succor from any person.

"As self-preservation, however, is the first law of nature, these sad thoughts did not so far prevail as to make me totally dispair. I proceeded on as fast as I conveniently could,

though with the utmost caution, and having at length got clear of this horrid passage, I found myself safe and unhurt in the large open space before St. Paul's church, which had been thrown down a few minutes before, and buried a great part of the congregation. Here I stood for some time, considering what I should do, and not thinking myself safe in this situation, I came to the resolution of climbing over the ruins of the west end of the church, in order to get to the river's side, that I might be removed as far as possible from the tottering houses, in case of a second shock.

"This, with some difficulty, I accomplished, and here I found a prodigious concourse of people of both sexes, and of all ranks and conditions. There were several priests who had run from the altars in their sacerdotal vestments; ladies half dressed, and some without shoes; all these, whom their mutual dangers had here assembled as to a place of safety, were on their knees at prayer, with the terrors of death in their countenances.

"In the midst of these devotions the second great shock came on, little less violent than the first, and completed the ruin of those buildings which had been already much shattered. The consternation now became so universal, that the shrieks and cries of the frightened people could be distinctly heard from the top of St. Catherine's hill, a considerable distance off, whither a vast number of the populace had likewise retreated. At the same time we could hear the fall of the parish church there, whereby many persons were killed on the spot, and others mortally wounded. On a sudden I heard a general outcry, 'The sea is coming in, we are lost!' Turning my eyes toward the river, which at this place is nearly four miles broad, I could perceive it heaving and swelling in a most unaccountable manner, as no wind was stirring. In an instant there appeared, at some small distance, a large body of water, rising as it were like a mountain. It came on foaming and roaring, and rushed toward the shore with such impetuosity,

that we all immediately ran for our lives, as fast as possible; many were actually swept away, and the rest were above their waists in water, at a good distance from the bank.

"For my own part, I had the narrowest escape, and should certainly have been lost, had I not grasped a large beam that lay on the ground, till the water returned to its channel, which it did with equal rapidity. As there now appeared at least as much danger from the sea as the land, and I scarce knew whither to retire for shelter, I took a sudden resolution of returning, with my clothes all dripping, to the area of St. Paul's. Here I stood some time, and observed the ships tumbling and tossing about as in a violent storm. Some had broken their cables and were carried to the other side of the Tagus; others were whirled around with incredible swiftness; several large boats were turned keel upward; and all this without any wind, which seemed the more astonishing.

"It was at the time of which I am now writing, that the fine new quay, built entirely of rough marble, at an immense expense, was entirely swallowed up, with all the people on it, who had fled thither for safety, and had reason to think themselves out of danger in such a place. At the same time a great number of boats and small vessels, anchored near it, all likewise full of people, who had retired thither for the same purpose, were all swallowed up, as in a whirlpool, and never more appeared.

"This last dreadful incident I did not see with my own eyes, as it passed three or four stone-throws from the spot where I then was, but I had the account as here given from several masters of ships, who were anchored within two or three hundred yards of the quay, and saw the whole catastrophe. One of them in particular informed me that when the second shock came on, he could perceive the whole city waving backwards and forwards, like the sea when the wind first begins to rise; that the agitation of the earth was so great, even under the river, that it threw up his large anchor from the mooring.

which swam, as he termed it, on the surface of the water; that immediately upon this extraordinary concussion, the river rose at once nearly twenty feet, and in a moment subsided; at which instant he saw the quay, with the whole concourse of people upon it, sink down, and at the same time everyone of the boats and vessels that were near it were drawn into the cavity, which he supposes instantly closed upon them, inasmuch as not the least sign of a wreck was ever seen afterwards.

"I had not been long in the area of St. Paul's, when I felt the third shock, which though somewhat less violent than the two former, the sea rushed in again and retired with the same rapidity, and I remained up to my knees in water, though I had gotten upon a small eminence at some distance from the river, with the ruins of several intervening houses to break its force. At this time I took notice the waters retired so impetuously, that some vessels were left quite dry, which rode in seven-fathom water. The river thus continued alternately rushing on and retiring several times, in such sort that it was justly dreaded Lisbon would now meet the same fate which a few years ago had befallen the city of Lima. The master of a vessel which arrived here just after the first of November assured me that he felt the shock above forty leagues at sea so sensibly that he really concluded that he had struck upon a rock, till he threw out the lead and could find no bottom; nor could he possibly guess at the cause till the melancholy sight of this desolate city left him no room to doubt it.

"I was now in such a situation that I knew not which way to turn; I was faint from the constant fatigue I had undergone, and I had not yet broken my fast. Yet this had not so much effect on me as the anxiety I was under for a particular friend, who lodged at the top of a very high house in the heart of the city, and being a stranger to the language, could not but be in the utmost danger. I determined to go and learn, if possible, what had become of him. I proceeded, with some hazard, to

the large space before the convent of Corpo Santo, which had been thrown down, and buried a great number of people. Passing through the new square of the palace, I found it full of coaches, chariots, chaises, horses and mules, deserted by their drivers and attendants, and left to starve.

"From this square the way led to my friend's lodgings through a long, steep and narrow street. The new scenes of horror I met with here exceed all description; nothing could be heard but sighs and groans. I did not meet with a soul in the passage who was not bewailing the loss of his nearest relations and dearest friends. I could hardly take a single step without treading on the dead or dying. In some places lay coaches, with their masters, horses and riders almost crushed in pieces; here, mothers with infants in their arms; there, ladies richly dressed, priests, friars, gentlemen, mechanics, either in the same condition or just expiring; some had their backs broken, others great stones on their breasts; some lay almost buried in the rubbish, and crying out in vain for succor, were left to perish with the rest.

"At length I arrived at the spot opposite to the house where my friend, for whom I was so anxious, resided; and finding this as well as the other contiguous buildings thrown down, I gave him up for lost, and thought only of saving my own life.

"In less than an hour I reached a public house, kept by a Mr. Morley, near the English burying-ground, about a half a mile from the city, where I found a great number of my countrymen in the same wretched circumstances as myself.

"Perhaps you may think the present doleful subject here concluded; but the horrors of the day are sufficient to fill a volume. As soon as it grew dark, another scene presented itself, little less shocking than those already described. The whole city appeared in a blaze, which was so bright that I could easily see to read by it. It may be said without exaggeration that it was on fire in at least a hundred different places

at once, and thus continued burning for six days together, without intermission, or without the least attempt being made to stop its progress.

"It went on consuming everything the earthquake had spared, and the people were so dejected and terrified that few or none had courage enough to venture down to save any part of their substance. I could never learn that this terrible fire was owing to any subterraneous eruption, as some reported, but to three causes, which all concurring at the same time, will naturally account for the prodigious havoc it made. The first of November being All Saint's Day, a high festival among the Portuguese, every altar in every church and chapel, some of which have more than twenty, was illuminated with a number of wax tapers and lamps, as customary; these setting fire to the curtains and timber work that fell with the shock, the conflagration soon spread to the neighboring houses, and being there joined with the fires in the kitchen chimneys, increased to such a degree, that it might easily have destroyed the whole city, though no other cause had concurred, especially as it met with no interruption.

"But what would appear almost incredible to you, were the fact less notorious and public, is, that a gang of hardened villains, who had escaped from prison when the wall fell, were busily employed in setting fire to those buildings, which stood some chance of escaping the general destruction. I cannot conceive what could have induced them to this hellish work, except to add to the horror and confusion, that they might, by this means, have the better opportunity of plundering with security. But there was no necessity for taking this trouble, as they might certainly have done their business without it, since the whole city was so deserted before night, that I believe not a soul remained in it, except those execrable villains, and others of the same stamp. It is possible some of them might have had other motives besides robbing, as one in particular being apprehended—they say he was a Moor, con-

demned to the galleys—confessed at the gallows that he had set fire to the King's palace with his own hand; at the same time glorying in the action, and declaring with his last breath, that he hoped to have burnt all the royal family.

"The whole number of persons that perished, including those who were burnt or afterwards crushed to death whilst digging in the ruins, is supposed, on the lowest calculation, to amount to more than sixty thousand; and though the damage in other respects cannot be computed, yet you may form some idea of it, when I assure you that this extensive and opulent city is now nothing but a vast heap of ruins; that the rich and poor are at present upon a level; some thousands of families which but the day before had been in easy circumstances, being now scattered about in the fields, wanting every convenience of life, and finding none able to relieve them.

"In order that you may partly realize the prodigious havoc that has been made, I will mention one more instance among the many that have come under my notice. There was a high arched passage, like one of our old city gates, fronting the west door of the ancient cathedral; on the left hand was the famous church of St. Antonio, and on the right, some private houses several stories high. The whole area surrounded by all these buildings did not much exceed one of our small courts in London. At the first shock, numbers of people who were then passing under the arch, fled into the middle of this area for shelter; those in the two churches, as many as could possibly get out, did the same. At this instant, the arched gate-way, with the fronts of the two churches and contiguous buildings, all inclined one toward another with the sudden violence of the shock, fell down and buried every soul as they were standing here crowded together."

The portion of the earth's surface convulsed by this earthquake is estimated by Humboldt to have been four times greater than the whole extent of Europe. The shocks were felt not only over the Spanish peninsula, but in Morocco and

Algeria they were nearly as violent. At a place about twenty-four miles from the city of Morocco, a great fissure opened in the earth, and the entire village, with all its inhabitants, upward of 8,000 in number, were precipitated into the gulf, which immediately closed over its prey.

The earthquake was also felt as far to the westward as the West Indian islands of Antigua, Barbados, and Martinique, where the tide, which usually rises about two feet, was suddenly elevated above twenty feet, the water being at the same time as black as ink. Toward the northwest the shock was perceptible as far as Canada, whose great lakes were all disturbed. Toward the east it extended to the Alps, to Thuringia, and to Töplitz, where the hot springs were first dried up, and soon after overflowed with ochreous water. In Scotland the waters both of Loch Lomond and Loch Ness rose and fell repeatedly. Toward the northeast, the shock was sensibly felt throughout the flat country of northern Germany, in Sweden, and along the shores of the Baltic.

At sea, 140 miles to the southward of Lisbon, the ship Denia was strained as if she had struck on a rock; the seams of the deck opened, and the compass was upset. On board another ship, 120 miles to the westward of Cape St. Vincent, the shock was so violent as to toss the men up perpendicularly from the deck. The great sea wave rose along the whole southern and western coasts of Portugal and Spain; and at Cadiz it is said to have risen to a height of sixty feet. At Tangier, on the northern coast of Africa, the tide rose and fell eighteen times in rapid succession. At Funchal in Madeira, where the usual ebb and flow of the tide is seven feet, it being half tide at the time, the great wave rolled in, and at once raised the level of the water fifteen feet above high water mark. This immense tide, rushing into the city, caused great damage, and several other parts of the island were similarly flooded. The tide was also suddenly raised on the southern coast of Ireland; the

CHAPTER XXVIII

JAPAN AND ITS DISASTROUS EARTHQUAKES AND VOLCANOES

BY TRUMBULL WHITE.

The Island Empire Subject to Convulsions of Nature—Legends of Ancient Disturbances—Famous Volcano of Fuji-yama Formed in One Night—More Than One Hundred Volcanoes in Japan—Two Hundred and Thirty-two Eruptions Recorded—Devastation of Thriving Towns and Busy Cities—The Capital a Sufferer—Scenes of Desolation after the Most Recent Great Earthquakes.

JAPAN may be considered the home of the volcano and the earthquake. Few months pass there without one or more earth shocks of considerable force, besides numerous lighter ones of too slight a nature to be worthy of remark. Japanese histories furnish many records of these phenomena.

There is an ancient legend of a great earthquake in 286 B.C., when Mount Fuji rose from the bottom of the sea in a single night. This is the highest and most famous mountain of the country. It rises more than 12,000 feet above the water level, and is in shape like a cone; the crater is 500 feet deep. It is regarded by the natives as a sacred mountain, and large numbers of pilgrims make the ascent to the summit at the commencement of the summer. The apex is shaped somewhat like an eight-petaled lotus flower, and offers from three to five peaks to view from different directions. Though now apparently extinct, it was in former times an active volcano, and the histories of the country mention several very disastrous eruptions. Japanese poets never weary in celebrating the praises of Fuji-san, or Fuji-yama, as it is variously called, and its conical form is one of the most familiar in Japanese painting and decorative art.

As Japan has not yet been scientifically explored throughout, and, moreover, as there is considerable difficulty in defining the kind of mountain to be regarded as a volcano, it is impossible to give an absolute statement as to the number of volcanoes in the country. If under the term volcano be included all mountains which have been in a state of eruption within the historical period, those which have a true volcanic form, together with those that still exhibit on their flanks matter ejected from a crater, we may conclude that there are at least 100 such mountains in the Japanese empire. Of this number about forty-eight are still active.

Altogether about 232 eruptions have been recorded, and of these the greater number took place in the southern districts. This may perhaps be accounted for by the fact that Japanese civilization advanced from the south. In consequence of this, records were made of various phenomena in the south when the northern regions were still unknown and unexplored.

The most famous of the active volcanoes is Asama-yama in Shinano. The earliest eruption of this mountain of which record now exists seems to have been in 1650. After that it was only feebly active for 133 years, when there occurred a very severe eruption in 1783. Even as late as 1870 there was a considerable emission of volcanic matter, at which time also violent shocks of earthquake were felt at Yokohama. The crater is very deep, with irregular rocky walls of a sulphur character, from apertures in which fumes are constantly sent forth.

Probably the earliest authentic instance of an earthquake in Japan is that which is said to have occurred in 416 A.D., when the imperial palace at Kioto was thrown to the ground. Again, in 599, the buildings throughout the province of Yamato were all destroyed, and special prayers were ordered to be offered up to the deity of earthquakes. In 679 a tremendous shock caused many fissures to open in the provinces of Chikuzen and Chikugo, in Kiushiu; the largest of these

chasms was over four miles in length and about twenty feet in width. In 829 the northern province of Dewa was visited in a similar manner; the castle of Akita was overthrown, deep rifts were formed in the ground in every direction, and the Akita river was dried up.

To descend to more recent instances, in 1702 the lofty walls of the outside and inside moats of the castle of Yeddo were destroyed, tidal waves broke along the coast in the vicinity, and the road leading through the famous pass of Hakone, in the hills to the east of Fuji-yama was closed up by the alteration in the surface of the earth. A period of unusual activity was between the years 1780 and 1800, a time when there was great activity elsewhere on the globe. It was during this period that Mount Unsen was blown up, and from 27,000 to 53,000 persons (according to different accounts) perished; that many islands were formed in the Satsuma sea; that Sakura-jima threw out so much pumice material that it was possible to walk a distance of twenty-three miles upon the floating debris in the sea; and that Asama ejected so many blocks of stone—one of which is said to have been forty-two feet in diameter—and a lava-stream sixty-eight kilometres in length.

In 1854 an earthquake destroyed the town of Shimoda, in the province of Idzu, and a Russian frigate, lying in the harbor at the time, was so severely damaged by the waves caused by the shock that she had to be abandoned. In 1855 came a great earthquake which was felt most severely at Yedo, though its destructive power extended for some distance to the west along the line of the Tokaido. It is stated that on this occasion there were in all 14,241 dwelling houses and 1,649 fire proof store houses overturned in the city, and a destructive fire which raged at the same time further increased the loss of life and property.

What was possibly the gravest disaster of its class in this land of volcanoes, since the terrible eruptions which came in the twenty years ending in 1800, occurred in the Bandai-san

region in northern Japan, on July 15, 1888. At about eight o'clock in the morning of that day, almost in the twinkling of an eye, Little Bandai-san was blown into the air, and wiped out of the map of Japan. A few moments later its debris had buried or devastated the surrounding country for miles, and a dozen or more of upland hamlets had been overwhelmed in the earthen deluge, or wrecked by other phenomena attending the outburst. Several hundreds of people had met with sudden and terrible death; scores of others had been injured; and the long roll of disaster included the destruction of horses and cattle, damming up of rivers, and laying waste of large tracts of rice-land and mulberry groves.

A small party was organized in Tokio to visit the scene. As the travelers approached the mountain, they were told that twenty miles in a straight line from Bandai-san no noise or earthquake was experienced on the 15th, but mist and gloom prevailed for about seven hours, the result of a shower of impalpable blue-gray ash, which fell to a depth of half an inch, and greatly puzzled the inhabitants. An ascent of about 3,000 feet was made to the back of the newly formed crater, so as to obtain a clear view of it and of the country which had been overwhelmed. Only on nearing the end of the ascent was the party again brought face to face with signs of the explosion. Here, besides the rain of fine, gray, ashen mud which had fallen on and still covered the ground and all vegetation, they came upon a number of freshly opened pits, evidently in some way the work of the volcano. Ascending the last steep rise to the ridge behind Little Bandai-san, signs of the great disaster grew in number and intensity.

The London Times correspondent, who was one of the party, wrote: "Fetid vapors swept over us, emanating from evil looking pools. Great trees, torn up by their roots, lay all around; and the whole face of the mountain wore the look of having been withered by some fierce and baleful blast. A few minutes further and we had gained the crest of the narrow

ridge, and now, for the first time, looked forth upon the sight we had come to see. I hardly know which to pronounce the more astonishing, the prospect that now opened before our eyes or the suddenness with which it burst upon us. To the former no more fitting phrase, perhaps, can be applied than that of absolute, unredeemed desolation—so intense, so sad, and so bewildering that I despair of describing it adequately in detail.

"On our right, a little above us, rose the in-curved rear wall of what, eight days before, had been Sho-Bandai-san, a ragged, almost sheer cliff, falling, with scarce a break, to a depth of fully 600 feet. In front of the cliff everything had been blown away and scattered over the face of the country before it, in a roughly fan-shaped deposit of for the most part unknown depth—deep enough, however, to erase every landmark, and conceal every feature of the deluged area. At the foot of the cliff, clouds of suffocating steam rose ceaselessly and angrily, and with loud roaring, from two great fissures in the crater bed, and now and then assailed us with their hellish odor. To our eyes, the base, denuded by the explosion, seemed to cover a space of between three and four square miles. This, however, can only be rough conjecture. Equally vague must be all present attempts to determine the volume of the disrupted matter. Yet, if we assume, as a very moderate calculation, that the mean depth of the debris covering a buried area of thirty square miles is not less than fifteen feet, we find that the work achieved by this great mine of Nature's firing was the upheaval and wide distribution of no fewer than 700,000,000 tons of earth, rocks, and other ponderous material. The real figure is probably very much greater."

The desolation beyond the crater, and the mighty mass thrown out by the volcano which covered the earth, were almost incredible. "Down the slopes of Bandai-san, across the valley of the Nagase-gawa, choking up the river, and stretching beyond it to the foot-hills, five or six miles away

swept a vast, billowy sheet of ash-covered earth or mud, obliterating every foot of the erstwhile smiling landscape. Here and there the eyes rested on huge, disordered heaps of rocky debris, in the distance resembling nothing so much as the giant, concrete, black substructure of some modern breakwater. It was curious to see on the farther side the sharp line of demarkation between the brown sea of mud and the green forests on which it had encroached; or, again, the lakes formed in every tributary glen of the Nagase-gawa by the massive dams so suddenly raised against the passage of their stream waters. One lake was conspicuous among the rest. It was there that the Nagase-gawa itself had been arrested at its issue from a narrow pass by a monster barrier of disrupted matter thrown right across its course. Neither living thing nor any sign of life could be discerned over the whole expanse. All was dismally silent and solitary. Beneath it, however, lay half a score of hamlets, and hundreds of corpses of men, women and children, who had been overtaken by swift and painful deaths."

Although the little village of Nagasaka was comparatively uninjured, nearly all its able-bodied inhabitants lost their lives in a manner which shows the extraordinary speed with which the mud-stream flowed. When Little Bandai-san blew up, and hot ashes and sand began to fall, the young and strong fled panic-stricken across the fields, making for the opposite hills by paths well known to all. A minute later came a thick darkness, as of midnight. Blinded by this, and dazed by the falling debris and other horrors of the scene, their steps, probably also their senses, failed them. And before the light returned every soul was caught by a swift bore of soft mud, which, rushing down the valley bed, overwhelmed them in a fate more horrible and not less sudden than that of Pharaoh and his host. None escaped save those who stayed at home—mostly the old and very young.

A terrible earthquake convulsed central Japan on the

morning of October 25, 1891. The waves of disturbance traversed thirty-one provinces, over which the earth's crust was violently shaken for ten minutes together, while slighter shocks were felt for a distance of 400 miles to the north, and traveled under the sea a like distance, making themselves felt in a neighboring island. In Tokio itself, though 170 miles from the center of disturbance, it produced an earthquake greater than any felt for nearly forty years, lasting twelve minutes. Owing, however, to the character of the movement, which was a comparatively slow oscillation, the damage was confined to the wrecking of some roofs and chimneys. Very different were its results in the central zone of agitation, concerning which a correspondent wrote as follows:

"There was a noise as of underground artillery, a shake, a second shake, and in less than thirty seconds the Nagoya-Gifu plain, covering an area of 1,200 square miles, became a sea of waves, more than 40,000 houses fell, and thousands of people lost their lives. The sequence of events was approximately as follows: To commence at Tokio, the capital, which is some 200 miles from the scene of the disaster, on October 25th, very early in the morning, the inhabitants were alarmed by a long, easy swaying of the ground, and many sought refuge outside their doors. There were no shocks, but the ground moved back and forth, swung round, and rose and fell with the easy, gentle motion of a raft upon an ocean swell. Many became dizzy, and some were seized with nausea."

These indications, together with the movements of the seismographs, denoted a disturbance at a considerable distance, but the first surmise that it was located under the Pacific Ocean, was unfortunately incorrect. The scene of the catastrophe was indicated only by tidings from its outskirts, as all direct news was cut off by the interruption of railway and telegraphic communication. An exploratory and relief party started on the second day from Tokio, not knowing how far

they would be able to proceed by train, and the correspondent who accompanied them thus described his experiences:

"Leaving Tokio by a night train, early next morning we were at Hamamatsu, 137 miles distant from Tokio, on the outside edge of the destructive area. Here, although the motion had been sufficiently severe to destroy some small warehouses, to displace the posts supporting the heavy roof of a temple, and to ruffle a few tiles along the eaves of the houses, nothing serious had occurred. At one point, owing to the lateral spreading of an embankment, there had been a slight sinkage of the line, and we had to proceed with caution. Crossing the entrance to the beautiful lake of Hamana Ko, which tradition says was joined to the sea by the breaking of a sand-spit by the sea waves accompanying an earthquake in 1498, we rose from the rice fields and passed over a country of hill and rock. Further along the line signs of violent movement became more numerous. Huge stone lanterns at the entrances of temples had been rotated or overturned, roofs had lost their tiles, especially along the ridge, sinkages in the line became numerous, and although there was yet another rock barrier between us and the plain of great destruction, it was evident that we were in an area where earth movements had been violent."

The theatre of maximum destruction was a plain, dotted with villages and homesteads, supporting, under the garden-like culture of Japan, 500 and 800 inhabitants to the square mile, and containing two cities, Nagoya and Gifu, with populations respectively of 162,000 and 30,000, giving probably a round total of half a million human beings. Within about twelve miles of Gifu, a subsidence on a vast scale took place, engulfing a whole range of hills, while over lesser areas the soil in many places slipped down, carrying with it dwellings and their inmates. Gifu was a total wreck, devastated by ruin and conflagration, causing the destruction of half its houses. Ogaki, nine miles to the west, fared even worse, for here only

113 out of 4,434 houses remained standing, and one-tenth of the population were killed or wounded. In one temple, where service was being held, only two out of the entire congregation escaped.

Nagoya, too, suffered heavily, and thousands of houses collapsed. The damage at this place was produced by three violent shocks in quick succession, preceded by a deep, booming sound. During the succeeding 206 hours, 6,600 earth spasms of greater or less intensity were felt at increasing intervals, occurring in the beginning probably at the rate of one a minute. The inhabitants were driven to bivouac in rude shelters in the streets, and there was great suffering among the injured, to whom it was impossible to give proper care for many days after the disaster. Some estimates placed the figure of the killed and wounded as high as 24,000, whilst not less than 300,000 were rendered homeless.

Owing to the frequency of earthquake shocks in Japan, the study of their causes and effects has had a great deal of attention there since the introduction of modern science into the island empire. The Japanese have proved as energetic in this direction as they are in purely material progress on the lines of western civilization, and already they are recognized as the most advanced of all people in their study of seismology and its accompanying phenomena.

CHAPTER XXIX

KRAKATOA, THE GREATEST OF VOLCANIC EXPLOSIONS

BY TRUMBULL WHITE.

The Volcano That Blew Its Own Head Off—The Terrific Crash Heard Three Thousand Miles—Atmospheric Waves Travel Seven Times Around the Earth—A Pillar of Dust Seventeen Miles High—Islands of the Malay Archipelago Blotted Out of Existence—Native Villages Annihilated—Other Disastrous Upheavals in the East Indies.

ONE of the fairest regions of the world is the Malay Archipelago of the East Indies. Here nature is prodigal with her gifts to man, and the cocoa-palm, cinnamon and other trees flourish, and rice, cotton, the sugar cane and tobacco yield their increase under cultivation. But beneath these scenes of loveliness, there are terrific energies, for this region is a focus of intense volcanic action. In the Sunda strait, between Sumatra and Java, there lies a group of small volcanic islands, the largest of which is Krakatoa. It forms part of the "basal wreck" of a large submarine volcano, whose visible edges are also represented by Velaten and Lang islands.

For two hundred years the igneous forces beneath Krakatoa remained dormant; but in September, 1880, premonitory shocks of earthquake were heard in the neighborhood. At length the inhabitants of Batavia and Bintenzorg were startled on May 20, 1883, by booming sounds which came from Krakatoa, one hundred miles distant. A mail steamer passing through the strait, had her compass violently agitated. Next

day a sprinkling of ashes was noticed at some places on each side of the strait, and toward evening a steam-column rising from Krakatoa revealed the locality of the disturbance. The commander of the German war ship Elisabeth, while passing, estimated the dust-column to be about thirty-six thousand feet, or seven miles high.

Volcanic phenomena being common to that region, no fears were entertained by the inhabitants in the vicinity; and an excursion party even started from Batavia to visit the scene of action. They reached the island on May 27th, and saw that the cone of Perborwatan was active, and that a column of vapor arose from it to a height of not less than ten thousand feet, while lumps of pumice were shot up to about six hundred feet. Explosions occurred at intervals of from five to ten minutes, each of these outbursts uncovering the liquid lava in the vent, the glow of which lighted up the overhanging steam-cloud for a few seconds.

Shortly after this visit the activity diminished. But on June 19th it was noticed at Anjer that the height of the dust and vapor-column, and likewise the explosions were again increasing. On the 24th a second column was seen rising. At length, Captain Ferzenaar, chief of the Topographical Survey of Bantam, visited Krakatoa island on August 11th. He found its forests destroyed, and the mantle of dust near the shores was twenty inches thick. Three large vapor-columns were noted, one marking the position of the crater of Perborwatan, while the other two were in the center of the island, and of the latter, one was probably Danan. There were also no less than eleven other eruptive foci, from which issued smaller steam-columns and dust. This was the last report prior to the great paroxysm.

During the next two or three weeks there was a decline in the energy of the volcano, but on the afternoon of Sunday, August 26th, and all through the following night, it was evident that the period of moderate eruptive action had passed,

and that Krakatoa had now entered upon the paroxysmal stage. From sunset on Sunday till midnight the tremendous detonations followed each other so quickly that a continuous roar may be said to have issued from the island. The full terrors of the eruption were now approaching. The distance of ninety-six miles from Krakatoa was not sufficient to permit sleep to the inhabitants of Batavia. All night volcanic thunders sounded like the discharges of artillery at their very doors. On the next morning there were four mighty explosions. The third was of appalling violence, and it gave rise to the most far-reaching effects. The entire series of grand phenomena at that spot extended over a little more than thirty-six hours.

Captain Thompson, of the Media, then seventy-six miles northeast of Krakatoa, saw a black mass like smoke rising into the clouds to an altitude estimated at not less than seventeen miles. The eruption was also viewed by Captain Wooldridge at a distance of forty miles. He speaks of the vapory mass looking like "an immense wall, with bursts of forked lightning, at times like large serpents rushing through the air." After sunset this dark wall resembled "a blood-red curtain with the edges of all shades of yellow, the whole of a murky tinge, with fierce flashes of lightning." Two other masters of vessels, at about the same distance from the volcano, report seeing the mastheads and yardarms of their ships aglow with electric fire. Such effects seem to be easily explicable. When we consider how enormous must be the friction going on in the hot air, through the clash against each other of myriads of particles of volcanic dust, during ejection and in their descent, it is evident that such friction is adequate to produce a widespread electrical disturbance in the surrounding atmosphere. The rush of steam through craters or other fissures would also contribute to these disturbances.

From these causes the compasses of passing ships were much disturbed. And yet the fall of magnetic oxide of iron

(magnetite), a constituent of volcanic ash, possibly had some share in creating these perturbations. On the telephone line from Ishore, which included a submarine cable about a mile long, reports like pistol shots were heard. At Singapore, five hundred miles from Krakatoa, it was noted at the Oriental Telephone Company's station that, on putting the receiver to the ear, a roar like that of a waterfall was heard. So great was the mass of vapor and dust in the air, that profound darkness, which lasted many hours, extended even to one hundred and fifty miles from the focus of the eruption. There is the record, among others, that it was "pitch dark" at Anjer at two o'clock in the afternoon of the 26th.

So great, too, was the ejective force that the fine volcanic dust was blown up to a height of fifty thousand feet, or over nine miles, into space. Another estimate gives the enormous altitude of seventeen miles to which the dust had been blown. The volcanic ash, which fell upon the neighboring islands within a circle of nine and one half miles radius, was from sixty-five to one hundred and thirty feet thick. At the back of the island the thickness of the ash beds was from one hundred and ninety-five to two hundred and sixty feet. Masses of floating pumice encumbered the strait. The coarser particles of this ash fell over a known area equal to 285,170 square miles, a space equal to the whole of the New England States, New York, New Jersey, Pennsylvania, Ohio Indania and Illinois. It is calculated that the matter so ejected must have been considerably over a cubic mile in volume.

Another distinguishing feature of this display of nature's powers was the magnitude and range of the explosive sounds. Lloyd's agent at Batavia, ninety-four miles distant from Krakatoa, reported that on the morning of the 27th the reports and concussions were simply deafening. At Carimon, Java, which is three hundred and fifty-five miles distant, the natives heard reports which led them to suppose that a distant ship was in distress; boats put off for what proved to be a futile search.

The explosions were heard not only all over the province of Macassar, nine hundred and sixty-nine miles from the scene of the eruption, but over a yet wider area. At a spot one thousand one hundred and sixteen miles distant—St. Lucia bay, Borneo—some natives heard the awful sound. It stirred their consciences, for, being guilty of murder, they fled, fearing that such sounds signified the approach of an avenging force. Again, in the island of Timor, one thousand three hundred and fifty-one miles away, the people were so alarmed that the government sent off a steamer to seek the cause of the disturbance.

At that time, also, the shepherds on the Victoria plains, West Australia, thought they heard the firing of heavy artillery, at a spot one thousand seven hundred miles distant. At midnight, August 26th, the people of Daly Waters, South Australia, were aroused by what they thought was the blasting of a rock, a sound which lasted a few minutes. "The time and other circumstances show that here again was Krakatoa heard, this time at the enormous distance of two thousand and twenty-three miles." And yet there is trustworthy evidence that the sounds were heard over even greater distances. Thundering noises were heard at Diego Garcia, in the Chagos islands, two thousand two hundred and sixty-seven miles from Krakatoa. It was imagined that some vessel must be in distress, and search was accordingly made. But most remarkable of all, Mr. James Wallis, chief of police in Rodriguez, across the Indian ocean, and nearly three thousand miles away from Krakatoa, made a statement in which he said that "several times during the night of August 26th-27th reports were heard coming from the eastward like the distant roar of heavy guns. These reports continued at intervals of between three and four hours." Obviously, some time was needed for the sounds to make such a journey. On the basis of the known rate of velocity, they must have been heard at Rodriguez four hours after they started from their source.

And yet, great as was the range of such vibrations, they could not be compared with that of the air-wave caused by the mighty outburst. This atmospheric wave started from Krakatoa at two minutes past ten on that eventful Monday morning, moving onward in an ever-widening circle, like that produced when a stone is thrown into smooth water. This ring-like wave traveled on at the rate of from six hundred and seventy-four to seven hundred and twenty-six miles an hour, and went around the world four, if not even seven times, as evidenced by the following facts: Batavia is nearly a hundred miles from the eruptive focus under review. There was connected with its gas-holder the usual pressure recorder. About thirteen minutes after the great outburst, this gauge showed a barometric disturbance equal to about four-tenths of an inch of mercury, that is, an extra air pressure of about a fifth of a pound on every square inch. The effects on the air of minor paroxysmal outbreaks are also recorded by this instrument; but barometers in the most distant places record the same disturbance. The great wave passed and repassed over the globe and no inhabitant was conscious of the fact. Barometers in the principal cities of the world automatically recorded this effect of the first great wave from Krakatoa to its antipodes in Central America, and also the return wave. The first four oscillations left their mark on upward of forty barograms, the fifth and sixth on several, and at Kew, England, the existence of a seventh was certainly established.

At the same time that this immense aerial undulation started on its tour around the world, another wave but of awful destructiveness, a seismic sea-wave, started on a similar journey. There can hardly be a doubt that this so-called "tidal-wave" was synchronous with the greatest of the explosions. A wave from fifty to seventy-two feet high arose and swept with resistless fury upon the shores each side of the straits. The destruction to life and property will probably never be fully known. At least thirty-six thousand lives were

lost; a great part of the district of North Bantam was destroyed; and the towns of Anjer, Merak, Tyringin, and neighboring villages were overwhelmed. A man-of-war, the Berouw, was cast upon the shore of Sumatra nearly two miles inland, and masses of coral from twenty to fifty tons in weight were torn from the bed of the sea and swept upon the shore.

The formerly fertile and densely populated islands of Sibuku and Sibesi were entirely covered by a deposit of dry mud severals yards thick, and furrowed by deep crevasses. Of the inhabitants all perished to a man. Three islands, Steers, Calmeyer, and the islet east of Verlaten, completely disappeared and were covered by twelve or fourteen feet of water. Verlaten, formerly one mass of verdure, was uniformly covered with a layer of ashes about one hundred feet thick.

A few days after this eruption some remarkable sky effects were observed in different parts of the world. Many of these effects were of extraordinary beauty. Accordingly scientific inquiry was made, and in due time there was collected and tabulated a list of places from whence these effects were seen, together with the dates of such occurrences. Eventually it was concluded that such optical phenomena had a common cause, and that it must be the dust of ultra-microscopic fineness at an enormous altitude. All the facts indicated that such a cloud started from the Sunda straits, and that the prodigious force of the Krakatoa eruption could at that time alone account for the presence of impalpable matter at such a height in the atmosphere.

This cloud traveled at about double the speed of an express train, by way of the tropics of Cancer and of Capricorn. Carried by westerly-going winds, in three days it had crossed the Indian Ocean and was rapidly moving over Central Africa; two days later it was flying over the Atlantic; then, for two more days over Brazil, and then across the Pacific toward its birth-place. But the wind still carried this

haze of fine particles onward, and again it went around the world within a fortnight. In November, the dust area had expanded so as to include North America and Europe.

Here are a few facts culled from the report of the Royal Society of London. On the 28th, at Seychelles, the sun was seen as through a fog at sunset, and there was a lurid glare all over the sky. At the island of Rodriguez, on that day, "a strange, red, threatening sky was seen at sunset." At Mauritius (28th), there is the record "Crimson dawn, sun red after rising, gorgeous sunset, first of the afterglows; sky and clouds yellow and red up to the zenith." 28th and 29th, Natal—"most vivid sunsets, also August 31st and September 5th, sky vivid red, fading into green and purple." On the last days of August and September 1st, the sun, as seen from South America, appeared blue, while at Panama on the 2d and 3d of that month, the sun appeared green. "On the 2d of September, Trinidad, Port of Spain—Sun looked like a blue ball, and after sunset the sky became so red that there was supposed to be a big fire." "On the 5th of September, Honolulu—Sun set green. Remarkable afterglow first seen. Secondary glow lasted till 7:45 P. M., gold, green and crimson colors. Corona constantly seen from September 5th to December 15th. Misty rippled surface of haze."

It remains to be said that when this now famous island of Krakatoa was visited shortly after the great eruption, wonderful changes were noted. The whole northern and lower portion of the island had vanished, except an isolated pitchstone rock, ten yards square, and projecting out of the ocean with deep water all around it. What a tremendous work of evisceration this must have been is attested by the fact that where Krakatoa island, girt with luxuriant forests, once towered from three hundred to fourteen hundred feet above the sunlit waters, it is now, in some places, more than a thousand feet below them.

There is no region more frequently visited by earthquakes

than the beautiful lands in the Indian ocean, and nowhere has greater damage been done than on the beautiful island of Java. In former ages Sumatra and Java formed one single island, but in the year 1115, after a terrific earthquake, the isthmus which connected them, disappeared in the waves with all its forests and fertile fields.

These two islands have more than 200 volcanoes, half of which have never been explored, but it is known that whenever there has been an eruption of any one of them, one or the other of the two islands has been visited by an earthquake. Moreover, earthquakes are so frequent in the whole archipelago that the principal ones serve as dates to mark time or to refer to, just as in our own country is the case with any great historic event. A month rarely passes without the soil being shaken, and the disappearance of a village is of frequent occurrence.

In 1822 the earthquake which accompanied the eruption of the Javanese volcano of Yalung-Yung, utterly destroyed 144 towns and villages. In 1772, when the Papand-Yung was in a state of furious eruption, the island of Java was violently agitated, and a tract of nearly twenty-five square leagues, which but the day before had been covered with flourishing villages and farms, was reduced to a heap of ruins. In 1815 an earthquake, accompanied by an eruption of the volcano of Timboro, in the island of Sumatra, destroyed more than 20,000 lives.

It is rare even in this archipelago that there occurs a cataclysm so terrible as that of 1883. When the first eruption of Krakatoa occurred on August 25, it seemed that it was a signal to the other volcanoes of Java and Sumatra. By mid-day Maha-Meru, the greatest, if not the most active of the Javanese volcanoes, was belching forth flame continuously. The eruption soon extended to the Gunung-Guntus and other volcanoes, until a third of the forty-five craters in Java were either in full blast, or beginning to show signs of eruption. While

these eruptions were going on, the sea was in a state of tremendous agitation. The clouds floating above the water were charged with electricity, and at one moment there were fifteen large water-spouts to be seen at the same time.

Men, women and children fled in terror from their crumbling habitations, and filled the air with their cries of distress. Hundreds of them who had not time to escape were buried beneath the ruins. On Sunday evening the violence of the shocks and of the volcanic eruptions increased, and the island of Java seemed likely to be entirely submerged. Enormous waves dashed against the shore, and in some cases forced their way inland, while enormous crevices opened in the ground, threatening to engulf at one fell swoop all the inhabitants and their houses.

Toward midnight there was a scene of horror passing the powers of imagination. A luminous cloud gathered above the chain of the Kandangs, which run along the southeastern coast of Java. This cloud increased in size each minute, until at last it came to form a sort of dome of a gray and blood-red color, which hung over the earth for a considerable distance. In proportion as this cloud grew, the eruptions gained fresh force, and the floods of lava poured down the mountain sides without ceasing, and spread into the valleys, where they swept all before them. On Monday morning, about two o'clock, the heavy cloud suddenly broke up, and finally disappeared, but when the sun rose it was found that a tract of country extending from Point Capucine to the south as far as Negery Passoerang, to the north and west, and covering an area of about fifty square miles, had entirely disappeared.

There stood the previous day the villages of Negery, and Negery Babawang. Not one of the inhabitants had escaped. They and their villages had been swallowed up by the sea.

CHAPTER XXX

OUR GREAT HAWAIIAN AND ALASKAN VOLCANOES

BY TRUMBULL WHITE.

Greatest Volcanoes in the World Are Under the American Flag—Huge Craters in Our Pacific Islands—Native Worship of the Gods of the Flaming Mountains—Eruptions of the Past—Heroic Defiance of Pele, the Goddess of Volcanoes, by a Brave Hawaiian Queen—The Spell of Superstition Broken—Volcanic Peaks in Alaska, Our Northern Territory—Aleutian Islands Report Eruptions,

UNDER the American flag we are ourselves the possessors of some of the greatest active volcanoes in the world, and the greatest of all craters, the latter extinct indeed, for many years, but with a latent power that no one could conceive should it once more begin activity.

Hawaii, Paradise of the Pacific, raised by the fires of the very Inferno out of the depths of the ocean centuries ago, to become in recent years a smiling land of tropic beauty and an American island possession! Hawaii is the land of great volcanoes, sometimes slumbering and again pouring forth floods of molten fire to overwhelm the peaceful villages and arouse the superstitious fears of the natives.

Alaska, too, is a region of great volcanic ranges and eruptive activity, the Aleutian islands being raised from the bed of the Pacific by the same natural forces.

The Hawaiian islands occupy a central position in the North Pacific ocean, about 2,000 miles west of the California coast. The group includes eight inhabited islands, all of vol-

canic origin, and they are, substantially, naught but solid aggregations of fused, basaltic rock shot up from the earth's center, during outbursts of bye-gone ages, and cooled into mountains of stone here in the midst of the greatest body of water on the globe. In many localities, however, the accretions of centuries have so covered them with vegetable growths that their general appearance is not greatly different from that of other sections of the earth's surface.

The largest of the group is Hawaii, and it includes nearly two-thirds of the total area. Here stand the highest mountains found on any island in the known world. Only a few peaks of the Alps are as high as Mauna Loa (Long mountain), which towers 13,675 feet above the level of the sea, and Mauna Kea (White mountain), the height of which is 13,805 feet. In east Maui stands Haleakala, with an elevation about equal to that of Mount Ætna. This extinct volcano enjoys the distinction of having the largest crater in the world, a monstrous pit, thirty miles in circumference and 2,000 feet deep. The vast, irregular floor contains more than a dozen subsidiary craters or great cones, some of them 750 feet high. At the Kaupo and Koolau gaps the lava is supposed to have burst through and made its way down the mountain sides. The cones are distinctly marked as one looks down upon them; and it is remarkable that from the summit the eye takes in the whole crater, and notes all its contents, diminished, of course, by their great distance. Not a tree, shrub, nor even a tuft of grass obstructs the view. The natives have no traditions of Haleakala in activity. There are signs of several lava flows, and one in particular is clearly much more recent than the others.

The greatest point of interest in the islands is the great crater of Kilauea. It is nine miles in circumference and perhaps a thousand feet deep. Nowhere else within the knowledge of mankind is there a living crater to be compared with it. Moreover, there is no crater which can be entered and explored with ease and comparative safety save Kilauea

alone. There have been a few narrow escapes, but no accidents and it is needless to add that no description can give anyone an adequate idea of the incomparable splendor of the scene. It is, indeed, a "bottomless pit," bounded on all sides by precipitous rocks. The entrance is effected by a series of steps, and below these by a scramble over lava and rock debris. The greater part of the crater is a mass of dead, though not cold, lava; and over this the journey is made to the farthest extremity of the pit, where it is necessary to ascend a tolerably steep hill of lava, which is the bank of the fiery lake. A step or two brings one close to the awful margin, and he looks down over smoking, frightful walls, three hundred feet or more, into a great boiling, bubbling, sizzling sea of fire.

The tendency of the current, if it may be so called, is centripetal, though at times it varies, flowing to one side; while along the borders of the pit, waves of slumbering lava, apparently as unmovable as those over which the traveler has just crossed, lie in wrinkled folds and masses, heaped against the shore. If one watches those waves closely, however, he will presently observe what appears like a fiery, red serpent coming up out of the lake and creeping through and under them, like a chain of brilliant flame, its form lengthening as it goes, until it has circumscribed a large share of the entire basin. Then it begins to spread and flatten, as though the body had burst asunder and was dissolving back again, along its whole trail, into the fierce flood of turbulent fury whence it came.

Soon the broad, thick mass of lava, thus surrounded, which seemed fixed and immovable, slowly drifts off from the shore to the center of the lake; reminding one of detached cakes of broken ice, such as are often seen in winter when the thaws come, or during spring freshets when the streams burst their encrusted chains. The force of this comparison is strengthened when these cakes reach the center, for there they go to pieces exactly after the manner of large pieces of ice, and turning upon their edges, disappear in the ravenous vortex

below, which is forever swallowing up all that approaches it, giving nothing back in return.

Two kinds of lava form on the face of the lake. One is stony, hard, and brittle; the other flexible and tough, similar to India-rubber. The flexible kind forms exclusively on one side of the basin and spreads over it like an immense, sombre blanket; and, as it floats down in slow procession to the central abyss, occasionally rises and falls with a flapping motion, by force of the generated gases underneath, like a sheet shaken in the wind.

Occasionally, the fire forces its way through this covering and launches huge, sputtering fountains of red-hot liquid lava high into the air, with a noise that resembles distant bombs exploding; and again, multitudes of smaller founts burst into blossom all over the lake, presenting a spectacle of wild beauty across its entire surface.

In Hawaiian mythology, Pele was the goddess of volcanoes, and she and her numerous family formed a class of deities by themselves. She with her six sisters, Hiiaka, her brother Kamohoalii, and others, were said to have emigrated from Kahiki (Samoa) in ancient times. They were said to have first lived at Moanalua in Oahu, then to have moved their residence to Kalaupapa, Molokai, then to Haleakala, and finally to have settled on Hawaii. Their headquarters were in the Hale-mau-mau, in the crater of Kilauea, but they also caused the eruptions of Mauna Loa and Hualalai. In southern Hawaii Pele was feared more than any other deity, and no one dared to approach her abode without making her an offering of the ohelo-berries that grow in the neighborhood. Whenever an eruption took place, great quantities of hogs and other articles of property were thrown into the lava stream in order to appease her anger.

In 1824, Kapiolani, the daughter of a great chief of Hilo, having been converted to Christianity by the missionaries, determined to break the spell of the native belief in Pele. In

spite of the strenuous opposition of her friends and even of her husband, she made a journey of about 150 miles, mostly on foot, from Kealakekua to Hilo, visiting the great crater of Kilauea on her way, in order to defy the wrath of Pele, and to prove that no such being existed.

On approaching the volcano, she met the priestess of Pele, who warned her not to go near the crater and predicted her death if she violated the tabus of the goddess.

"Who are you?" demanded Kapiolani.

"One in whom the goddess dwells," she replied.

In answer to a pretended letter of Pele, Kapiolani quoted passages from the Bible until the priestess was silenced. Kapiolani then went forward to the crater, where Mr. Goodrich, one of the missionaries, met her. A hut was built for her on the eastern brink of the crater, and here she passed the night.

The next morning she and her company of about eighty persons descended over 500 feet to the "Black Ledge." There, in full view of the grand and terrific action of the inner crater, she ate the berries consecrated to Pele, and threw stones into the burning lake, saying: "Jehovah is my God. He kindled these fires. I fear not Pele. If I perish by her anger, then you may fear Pele; but if I trust in Jehovah, and he preserve me when breaking her tabus, then you must fear and serve him alone. . . ."

It is needless to say that she was not harmed, and this act did much to destroy the superstitious dread in which the heathen goddess was held by the ignorant and credulous natives.

The history of Hawaiian volcanic eruptions tells no such tales of horror as regards the loss of life and property as may be read in the accounts of other great volcanoes of the globe. This, however, is simply because the region is less populated, and their tremendous manifestations of power have lacked material to destroy. There have been fatal catastrophes, and ruin has been wrought which seems slight only in comparison with the greater disasters of a similar nature.

In 1855 an eruption of Mauna Loa occurred. The lava flowed toward Hilo, and for several months, spreading through the dense forests which belt the mountain, crept slowly shorewards, threatening this beautiful portion of Hawaii with the fate of the Cities of the Plain. For five months the inhabitants watched the inundation, which came a little nearer every day. Should they flee or not? Would their beautiful homes become a waste of jagged lava and black sand, like the neighboring district of Puna, once as fair as Hilo? Such questions suggested themselves as they nightly watched the nearing glare, till the fiery waves met with obstacles which piled them up in hillocks eight miles from Hilo, and the suspense was over.

Only gigantic causes can account for the gigantic phenomena of this lava-flow. The eruption traveled forty miles in a straight line, or sixty including sinuosities. It was from one to three miles broad, and from five to 200 feet deep, according to the contours of the mountain slopes over which it flowed. It lasted for thirteen months, pouring out a torrent of lava which covered nearly 300 square miles of land, and its volume was estimated at 38,000,000,000 cubic feet! In 1859 lava fountains 400 feet in height, and with a nearly equal diameter, played on the summit of Mauna Loa. This eruption ran fifty miles to the sea in eight days, but the flow lasted much longer, and added a new promontory to Hawaii.

On March 27, 1868, a series of earthquakes began and became more startling from day to day, until their succession became so rapid that the island quivered like the lid of a boiling pot nearly all the time between the heavier shocks. The trembling was like that of a ship struck by a heavy wave. Late in the afternoon of April 2, the climax came. The crust of the earth rose and sank like the sea in a storm. Rocks were rent, mountains fell, buildings and their contents were shattered, trees swayed like reeds, animals ran about demented; men thought the judgment had come. The earth

opened in thousands of places, the roads in Hilo cracked open; horses and their riders, and people afoot, were thrown violently to the ground. At Kilauea the shocks were as frequent as the ticking of a watch. In Kau, south of Hilo, 300 shocks were counted during the day. An avalanche of red earth, supposed to be lava, burst from the mountain side, throwing rocks high into the air, swallowing up houses, trees, men and animals, and traveling three miles in as many minutes, burying a hamlet with thirty-one inhabitants, and 500 head of cattle.

The people of the valleys fled to the mountains, which themselves were splitting in all directions, and collecting on an elevated spot, with the earth reeling under them, they spent a night of terror. Looking toward the shore, they saw it sink, and at the same moment a wave, whose height was estimated at from forty to sixty feet, hurled itself upon the coast and receded five times, destroying whole villages and engulfing forever forty-six people who had lingered too near the shore.

Still the earthquakes continued, and still the volcanoes gave no sign. People put their ears to the quivering ground and heard, or thought they heard, the surgings of the imprisoned lava sea rending its way among the ribs of the earth. Five days after the destructive earthquake of April 2, the ground south of Hilo burst open with a crash and a roar, which at once answered all questions concerning the volcano. The molten river, after traveling underground for twenty miles, emerged through a fissure two miles in length with a tremendous force and volume. Four huge fountains boiled up with terrific fury, throwing crimson lava and rocks weighing many tons from 500 to 1,000 feet.

Mr. Whitney, of Honolulu, who was near the spot, says: "From these great fountains to the sea flowed a rapid stream of red lava, rolling, rushing, and tumbling like a swollen river, bearing along in its current large rocks that made the lava foam as it dashed down the precipice and through the valley into the sea, surging and roaring throughout its length like a

cataract, with a power and fury perfectly indescribable. It was nothing else than a river of fire from 200 to 800 feet wide and twenty deep, with a speed varying from ten to twenty-five miles an hour. From the scene of these fire fountains, whose united length was about one mile, the river in its rush to the sea divided itself into four streams, between which it shut up men and beasts. Where it entered the sea it extended the coast-line half a mile, but this worthless accession to Hawaiian acreage was dearly purchased by the loss, for ages at least, of 4,000 acres of valuable agricultural land, and a much larger quantity of magnificent forest.

The entire southeast shore of Hawaii sank from four to six feet, which involved the destruction of several hamlets and the beautiful fringe of cocoanut trees. Though the region was very thinly peopled, 100 lives were sacrificed in this week of horrors; and from the reeling mountains, the uplifted ocean, and the fiery inundation, the terrified survivors fled into Hilo, each with a tale of woe and loss. The number of shocks of earthquake counted was 2,000 in two weeks, an average of 140 a day; but on the other side of the island the number was incalculable.

Since that time there have been several eruptions of these great Hawaiian volcanoes, but none so destructive to life and property. Only two years ago the crater of Mauna Loa was in eruption for some weeks, and travelers journeyed to the vicinity from all over the world to see the grand display of Nature's power in the fountains of lava and the blazing rivers flowing down the mountain side. The spectacle could be viewed perfectly at night from ships at sea, and from places of safety on shore.

Across the North Pacific, from Kamschatka to Alaska, is a continuous chain of craters in the Aleutian islands, forming almost a bridge over the ocean, and from Alaska down the western coasts of the two Americas is a string of the mightiest volcanoes in existence. Iceland is a seething caldron under

its eternal snows, and in a hundred places where some great, jagged cone of a volcano rises, seemingly dead and lifeless, only a fire-brand in the hand of nature may be needed to awaken it to a fury like that of which its vast lava beds, pinnacles, and craters are so eloquent.

The world's record for the extent of an eruption probably belongs to the great volcano Skaptan Jokul, in Iceland. This eruption began on June 11, 1783, having been preceded by violent earthquakes. A torrent of lava welled up into the crater, overflowed it, and ran down the sides of the cone into the channel of the Skapta river, completely drying it up. The river had occupied a rocky gorge, from 400 to 600 feet deep, and averaging 200 feet wide. This gorge was filled, a deep lake was filled, and the rock, still at white heat, flowed on into subterranean caverns. Tremendous explosions followed, throwing boulders to enormous heights. A week after the first eruption another stream of lava followed the first, debouched over a precipice into the channel of another river, and finally, at the end of two years, the lava had spread over the plains below in great lakes twelve to fifteen miles wide and a hundred feet deep. Twenty villages were destroyed by fire, and out of 50,000 inhabitants nearly 9,000 perished, either from fire or from noxious vapors.

The Skapta river branch of this lava stream was fifty miles long and in places twelve to fifteen miles wide; the other stream was forty miles long, seven miles broad, and the range of depth in each stream was from 100 to 600 feet. Professor Bischoff has called this, in quantity, the greatest eruption of the world, the lava, piled, having been estimated as of greater volume than is Mont Blanc.

Regarding the volcanoes of the United States, Mount Shasta is one of the most interesting of them. It has an altitude of 14,350 feet, towering more than a mile above its nearest neighbor. Four thousand feet of its peak are above timber line, covered with glaciers, while the mountain's base is seven-

teen miles in diameter. Shasta is almost continually showing slight evidences of its internal fires. Another of the famous cones is that of Mount Hood, standing 11,225 feet, snow-capped, and regarded as an extinct volcano.

As to the volcanic records of the great West, they may be read in the chains of mountains that stretch from Alaska 10,000 miles to Tierra del Fuego. In the giant geysers and hot springs of the Yellowstone Park are evidences of existing fires in the United States; while as to the extent of seismic disturbances of the past, the famous lava beds of Dakota, in which Captain Jack, the Modoc chief, held out against government troops till starved into submission, are volcanic areas full of mute testimony regarding nature's convulsions.

How soon, if ever, some of these volcanic areas of the United States may burst forth into fresh activity, no one can predict. If the slumbering giants should arouse themselves and shake off the rock fetters which bind their strength, the results might be terrible to contemplate. Those who dwell in the shadow of such peaks as are believed to be extinct, become indifferent to such a possible threat after many years of immunity, but such a disaster as that of St. Pierre arouses thought and directs scrutiny once more upon the ancient volcanic peaks of the Rocky Mountains and the Sierra Nevadas.

CHAPTER XXXII

SOUTH AMERICAN CITIES DESTROYED

BY TRUMBULL WHITE.

Earthquakes Ravage the Coast Cities of Peru and the Neighboring Countries — Spanish Capitals in the New World Frequent Sufferers—Lima, Callao and Caracas Devastated—Tidal Waves Accompany the Earthquakes—Juan Fernandez Island Shaken—Fissures Engulf Men and Animals—Peculiar Effects Observed.

THE discovery of America, in 1492, brought a great accession to the number of recorded earthquakes, as South and Central America and the islands near them have furnished almost innumerable instances of the phenomena.

The first of the known earthquakes in the western hemisphere occurred in 1530, and the Gulf of Paria, with the adjacent coast of Cumana, in Venezuela, was the scene of the catastrophe. It was accompanied by a great sea-wave, the tide suddenly rising twenty-four feet, and then retiring. There were also opened in the earth several large fissures, which discharged black, fetid salt water and petroleum. A mountain near the neighboring Gulf of Caracas was split in twain, and has since remained in its cloven condition.

The coast of Peru was visited by an earthquake in the year 1586, and again in 1687. On the first occasion the shock was accompanied by a great sea-wave eighty-four feet high, which inundated the country for two leagues inland. There was still another dreadful convulsion on this coast in 1746, when the sea twice retreated and dashed in again with a tremendous wave about eighty feet high, overwhelming Lima and four other seaports. A portion of the coast sank down,

producing a new bay at Callas; and in several mountains in the neighborhood there were formed large fissures whence water and mud gushed forth. On May 24, 1751, the city of Concepcion, in Chili, was entirely swallowed up during an earthquake, and the sea rolled over its site. The ancient port was destroyed, and a new town was afterwards erected ten miles inland. The great sea-wave, which accompanied this earthquake, rolled in upon the shores of the island of Juan Fernandez, and overwhelmed a colony which had been recently established there. The coast near the ancient port of Concepcion was considerably raised on this occasion, and the high water mark now stands twenty-four feet below its former level.

The coast of Caracas and the adjacent island of Trinidad were violently convulsed in 1776, and the whole city of Cumana was reduced to ruins. The shocks were continued for upwards of a year, and were at first repeated almost hourly. There were frequent eruptions of sulphurous water from fissures in the ground, and an island in the Orinoco disappeared.

Rihamba must have stood, it would appear, almost immediately over the focus of the dreadful earthquake of February 4, 1797. This unfortunate city was situated in the district of Quito, not far from the base of the great volcano of Tunguragua. That mountain was probably the center of disturbance, and the shock was experienced with disastrous effects over a district of country extending about 120 miles from north to south and about sixty miles from east to west. Every town and village comprehended within this district was reduced to ruins. The shocks, however, were felt, though in a milder form, over a much larger area, extending upwards of 500 miles from north to south and more than 400 miles from east to west.

At Riobamba the shocks, which began at about eight o'clock in the morning, are said to have been vertical. Some faint idea may be formed of the extreme violence of this motion from the fact mentioned by Humboldt that the dead bodies of

some of the inhabitants who perished were tossed over a small river to the height of several hundred feet, and landed on an adjacent hill.

Vertical movements, so powerful and so long continued, could not fail to produce an enormous displacement of the ground, and to be very destructive to all buildings which it sustained. The soil was rent, and, as it were, torn asunder and twisted in an extraordinary manner. Several of the fissures opened and closed again; many persons were engulfed in them; but a few saved themselves by simply stretching out their arms, so that, when the fissure closed, the upper parts of their bodies were left above the ground, thus admitting of their being easily extricated. In some instances whole cavalcades of horsemen and troops of laden mules disappeared in those chasms; while some few escaped by throwing themselves back from the edge of the cleft.

The amount of simultaneous elevation and depression of the ground was in some cases as much as twelve feet; and several persons who were in the choir of one of the churches escaped by simply stepping on the pavement of the street, which was brought up to a level with the spot where they stood. Instances occurred of whole houses sinking bodily into the earth, till their roofs were fairly underground; but so little were the buildings thus engulfed injured, that their inhabitants were able still to live in them, and by the light of flambeaux to pass from room to room, the doors opening and shutting as easily as before. The people remained in them, subsisting on the provisions they had in store, for the space of two days, until they were extricated safe and sound. With the majority of the inhabitants, however, it fared otherwise. The loss of life in the city, and throughout the district most convulsed, was enormous, 40,000 persons altogether having perished.

Of Riobamba itself the ruin was complete. When Humboldt took a plan of the place after the catastrophe, he could

find nothing but heaps of stones eight or ten feet high; although the city had contained churches and convents, with many private houses several stories in height. The town of Quero was likewise entirely overthrown.

At Tacunga the ruin was nearly as thorough, not a building having been left standing save an arch in the great square, and part of a neighboring house. The churches of St. Augustin, St. Domingo, and La Merced were at the moment thronged with people hearing mass. Not one escaped alive. All were buried, along with the objects of their worship, under the ruins of their consecrated buildings. In several parts of the town and its neighborhood there were opened larger fissures in the ground, whence quantities of water poured forth. The village of St. Philip, near Tacunga, containing a school in which upwards of forty children were assembled at the time, disappeared bodily in a chasm. A great many other villages with their inhabitants were destroyed, by being either overthrown or engulfed.

Even at Quito, although so distant from the centre of the disturbance, a great deal of damage was done to the churches and other public buildings by the shock, several being wholly ruined. The private houses and other buildings of moderate height, however, were spared. The superstitious inhabitants of this fair city, having been greatly alarmed by an unwonted display of luminous meteors, had devoted the previous day to carrying in procession through their streets the graven images and relics of their saints, in the vain hope of appeasing divine wrath. They were doomed to learn by experience that these idols were powerless to protect even the consecrated edifices dedicated to their honor, and in which they were enshrined.

The Bay of Caracas was the scene of a dreadful earthquake in 1812. The city of Caracas was totally destroyed, and ten thousand of its inhabitants were buried beneath its ruins.

The shock was most severe in the northern part of the

town, nearest to the mountain of La Silla, which rises like a vast dome, with steep cliffs in the direction of the sea. The churches of the Trinity and Alta Gracia, the latter of which was more than one hundred and fifty feet high, and the nave of which was supported by pillars twelve or fifteen feet thick, were reduced to a mass of ruins not more than five or six feet high. The subsidence of the ruins was such that scarcely a vestige of pillar or column could be found. The barracks of San Carlos disappeared altogether, and a regiment of infantry, under arms to take part in a procession, was swallowed up with the exception of a few men.

Nine-tenths of the town was annihilated. The houses which had not collapsed were cracked to such an extent that their occupants did not dare to re-enter them. To the estimate of 10,000 victims caused by the earthquake, must be added the many who succumbed, weeks and months afterward, for want of food and relief. The night of Holy Thursday to Good Friday presented the most lamentable spectacle of desolation and woe which can well be conceived. The thick layer of dust, which, ascending from the ruins, obscured the air like mist, had again settled on the ground; the earthquake shocks had ceased, and the night was calm and clear. A nearly full moon lighted up the scene, and the aspect of the sky was in striking contrast with that of a land strewn with corpses and ruins.

Mothers might be seen running about with their children whom they were vainly trying to recall to life. Distracted families were searching for a brother, a husband, or some other relative, whose fate was unknown to them, but who, they hoped, might be discovered in the crowd. The injured lying half buried beneath the ruins were making piteous appeals for help, and over 2,000 were extricated. Never did human kindness reveal itself in a more touching and ingenious fashion than in the efforts made to relieve the sufferers whose cries were so heart-breaking to hear. There were no tools to clear

away the rubbish, and the work of relief had to be performed with the bare hands.

The injured and the sick who had escaped from the hospitals were carried to the banks of the river Guayra, where their only shelter was the foliage of the trees. The beds, the lint for binding up wounds, the surgical instruments, the medicines and all the objects of immediate necessity were buried beneath the ruins, and for the first few days there was a scarcity of everything, even of food. Water was also very scarce inside the town, as the shock had broken up the conduits of the fountains and the upheaval had blocked the springs that fed them. In order to get water it was necessary to descend to the river Guayra, which had risen to a great height, and there were very few vessels left to get it in.

It was necessary, also, to dispose of the dead with all dispatch, and in the impossibility of giving decent burial to so many thousand corpses, detachments of men were told off to burn them. Funeral pyres were erected between the heaps of ruins, and the ceremony lasted several days.

The fierce shocks which had in less than a minute occasioned such great disasters could not be expected to have confined their destructive effects to one narrow zone of the continent, and these extended to a great part of Venezuela, all along the coast and specially among the mountains inland. The towns of La Guayra, Mayquetia, Antimano, Baruta, La Vega, San Felipe, and Merida were entirely destroyed, the number of deaths exceeding 5,000 at La Guayra and San Felipe.

In November, 1822, the coast of Chile began to be violently convulsed by a succession of shocks, the first of which was of great severity. The heavings of the earth were quite perceptible to the eye. The sea rose and fell to a great extent in the harbor of Valparaiso, and the ships appeared as if they were first rapidly forced through the water, and then struck on the ground. The town of Valparaiso and several others were

completely overthrown. Sounds like those produced by the escape of steam accompanied this earthquake, and it was felt throughout a distance of 1,200 miles along the coast, a portion of which—extending to about 100 miles—was permanently raised to a height varying from two to four feet. At Quintero the elevation was four feet, and at Valparaiso three feet; but about a mile inland from the latter place the elevation was as much as six or seven feet; while the whole surface raised is estimated at nearly 100,000 square miles.

The year 1868 proved very disastrous in South America. On the 13th of August of that year a series of shocks commenced which were felt over a large extent of country, stretching from Ibarra on the northwestern border of Ecuador to Cabija on the coast of Bolivia, a distance of about 1,400 miles. The effects were most severe about the southern portion of the Peruvian coast, where the towns of Iquique, Arica, Tacna, Port Ilay, Arequipa, Pisco, and several others were destroyed, and in the northern parts of Ecuador, where the town of Ibarra was overthrown, burying nearly the whole of the inhabitants under its ruins. A small town in the same quarter, named Cotocachi, was engulfed, and its site is now occupied by a lake. The total loss of lives is estimated at upward of 20,000.

On May 15, 1875, earthquake shocks of a serious character were experienced over large areas of Chile. At Valparaiso the shock lasted for forty-two seconds, with a vertical motion, so that the ground danced under foot. Two churches and many buildings were damaged. Another earthquake occurred at Valparaiso, July 8, when there were six shocks in succession. The inhabitants took refuge in the streets, several people were killed, and much damage was done to property.

About the middle of May, 1875, a most disastrous earthquake visited New Granada, the region of its influence extending over an area 500 miles in width. It was first felt perceptibly at Bogota; thence it traveled north, gaining inten-

sity as it went, until it reached the southeast boundary line of Magdalena, where its work of destruction began. It traveled along the line of the Andes, destroying, in whole or in part, the cities of Cucuta, San Antonio, and Santiago, and causing the death of about 16,000 persons. On the evening of May 17, a strange rumbling sound was heard beneath the ground, but no shock was felt. This premonitory symptom was followed on the morning of the 18th by a terrific shock. "It suddenly shook down the walls of houses, tumbled down churches, and the principal buildings, burying the citizens in the ruins." Another shock completed the work of destruction, and shocks at intervals occurred for two days. "To add to the horrors of the calamity, the Lobotera volcano, in front of Santiago, suddenly began to shoot out lava in immense quantities in the form of incandescent balls of fire, which poured into the city and set fire to many buildings."

On the evening of April 12, 1878, a severe earthquake occurred in Venezuela which destroyed a considerable portion of the town of Cua. Immediately preceding the shock the sky was clear and the moon in perfect brightness. It lasted only two seconds, but in that time the center of the town, which was built on a slight elevation, was laid in ruins. The soil burst at several places, giving issue to water strongly impregnated with poisonous substances.

The Isthmus of Panama was the scene of a succession of earthquakes in September, 1882, which, although the loss of life was small, were exceedingly destructive to property. On the morning of September 7, the inhabitants of Panama were roused from their beds by the occurrence of one of the longest and most severe shocks ever experienced in that earthquake-vexed region. Preceded by a hollow rumbling noise, the first shock lasted nearly thirty seconds, during which it did great damage to buildings. It was severely felt on board ship, passengers declaring that the vessel seemed as if it were lifted bodily from the sea and then allowed to fall back.

Its effects on the Panama railway were very marked. The stone abutments of several of the bridges were cracked, and the earthworks sank in half a dozen places. In other places the rails were curved as if they had been intentionally bent. Other shocks less severe followed the first, until at 11:30, another sharp shock alarmed the whole city, and drove the inhabitants at once from their houses into the squares. This earthquake was also severely felt at Colon, where it lasted for fully a minute, moving many buildings from their foundations, and creating intense alarm. A deep fissure, 400 yards in length, was opened in the earth.

To what extent this tendency to earthquake shocks threatens the proposed Panama Canal, it is difficult to say. Beyond question a great earthquake would do immense damage to such a channel and its lock gates, but the advocates of the Panama route argue with apparent truth that even so it has a great advantage over the Nicaragua route. In the latter, volcanoes are numerous, and eruptions not infrequent. Lake Nicaragua itself, through which the canal route passes, has in it several islands which are but volcanic peaks raised above the water, and the whole region is subject to disturbances from the interior of the earth.

CHAPTER XXXI

EARTHQUAKES AND VOLCANOES IN CENTRAL AMERICA AND MEXICO

BY TRUMBULL WHITE.

A Region Frequently Disturbed by Subterranean Forces—Guatemala a Fated City—A Lake Eruption in Honduras Described by a Great Painter—City of San Jose Destroyed—Inhabitants Leave the Vicinity to Wander as Beggars—Disturbances on the Route of the Proposed Nicaraguan Canal—San Salvador is Shaken—Mexican Cities Suffer.

CENTRAL AMERICA is continually being disturbed by subterranean forces. Around the deep bays of this vast and splendid region, upon the shores laved by the waters of the Pacific, and also about the large inland lakes, rise, like an army of giants, a number of lofty volcanoes. Whilst most of them are wrapped in slumber which has lasted for centuries, others occasionally roar and groan as if in order to keep themselves awake, and to watch well over their sleeping companions. The fire which consumes their entrails extends far beneath the soil, and often causes it to tremble. Three times within thirty years the town of Guatemala has been destroyed by earthquakes, and there is not in all Guatemala, Honduras, or any other state of Central America a single coast which has not been visited by one or more violent subterranean shocks. When the earthquakes occur in remote regions, far from the habitations of men, in the midst of virgin forests, or in the vicinity of large lakes, they give rise to very singular phenomena.

In 1856, a painter, entrusted with an official mission in Honduras, witnessed an event of this kind, and though he sought

to conceal his identity, he was generally believed to be Herr Heine, the well-known painter and explorer of Central America. Upon the day in question he was sailing across a large lagoon named Criba, some twenty miles broad, the weather being calm, and the sun shining brilliantly. After having secured his boat to the shore, he had landed at the entrance to a beautiful little village commanding a view of the plain dotted with houses and with stately trees. Upon the opposite shore extended the forest, with the sea in the far distance. The chief inhabitant of the village having invited Herr Heine and his companions to come in and rest, the whole party were seated beneath the veranda of the house, engaged in pleasant conversation. Suddenly, a loud noise was heard in the forest. The birds flew off in terror; the cocoanut palms bent and writhed as if in panic, and large branches of them snapped off; shrubs were torn up from the ground and carried across the lake. All this was the effect of a whirlwind traveling through space from south to north.

The whole affair lasted only a few seconds, and calm was re-established in Nature as suddenly as it had been disturbed. Conversation, of course, then turned upon the phenomenon just witnessed, and the natives maintained that atmospheric disturbances of this kind are the forerunners of severe earthquakes or violent volcanic eruptions; some of them declaring that a disaster of this character had doubtless just occurred somewhere. The host, an elderly man much esteemed in the district for his knowledge, went on to describe many such catastrophes which he himself had witnessed. He spoke more particularly of the eruption of the volcano of Coseguina, in Nicaragua, which had been preceded by a fierce whirlwind, which had been so strong that it carried pieces of rock and ashes to a distance of nearly a mile. The captain of a large sailing vessel had told him that upon the following day, when more than 100 miles from the coast, he had found the sea covered with pumice-stone, and had experienced great difficulty in

threading a way for his vessel through these blocks of volcanic stone which were floating upon the surface like icebergs.

Everyone, including the European, had his story to tell, and while the party were still in conversation, a terrible noise like thunder was heard, and the earth began to quake. At first the shocks were felt to be rising upward, but after a few seconds they became transformed into undulations traveling northward, just as the sudden whirlwind had done. The soil undulated like the surface of a stormy sea, and the trees were rocked to and fro so violently that the topmost branches of the palms came in contact with the ground and snapped off. The traveler and his friends, believing themselves to be out of danger, were able to follow with ever-increasing interest the rapid phases of the disturbance, when a strange and alarming phenomenon attracted their notice.

"Our attention was called," relates Herr Heine, "to a terrible commotion in the direction of the lagoon, but I cannot express what I then saw, I did not know if I was awake or a prey to a nightmare; whether I was in the world of reality or in the world of spirits."

The water of the lagoon disappeared as if it were engulfed in a sort of a subterranean cavern, or rather, it turned over upon itself, so that from the shore to the center of the lake the bed was quite empty. But in a few moments the water reappeared, and mounting toward the center of the enormous basin, it formed an immense column, which, roaring and flecked with foam, reached so high that it intercepted the sunlight. Suddenly, the column of water collapsed with a noise as of thunder, and the foaming waves dashed toward the shore. Herr Heine and his companions would have perished if they had not been standing upon elevated ground, and, as it was, they could not restrain an exclamation of horror as they saw this mass of water, like solid rock, rolling along the plain, carrying trees, large stones, and whole fields before it.

"I saw all that without at first thinking of our own fate,"

recites Herr Heine, "and I think that the greatness of the peril which threatened the whole country made me indifferent as to the fate of myself and my companions. In any case, when I saw my familiar companion, Carib, nearly carried off, I remained indifferent, and it was only after two others of my followers, Manuel and Michel, had had very narrow escapes, that I succeeded in shaking off my apathy, and going to their assistance."

When the travelers, whose boat had disappeared, started for the town of San Jose, whence they had come in the morning, they were able to judge for themselves as to the extent of the disaster. All the country which they had passed through had been laid waste. Large masses of rock had been detached from the mountains, and obstructed the course of streams which had overflown their banks or changed their course. Whole villages had been destroyed, and in all directions arose the lamentations of the unfortunate inhabitants. The region over which the waters of the lagoon had been carried was no longer to be identified as the same, covered as it was with debris of every kind, and with a thick layer of sand and rock.

When they started in the morning, the travelers had left San Jose prosperous and full of cheerful stir, but when they returned at night they found it in ruins and almost deserted. The earthquake had overthrown all the houses with the exception of about twenty, and these were very badly damaged.

All the buildings in solid masonry, including the massive church, were heaps of ruins; and most of the inhabitants had perished. The Indians who were prowling in the outskirts of the town took advantage of the catastrophe to carry off all they could from the houses which were still standing and from the ruins of the others. The agility with which these Indians move about among the ruins and escape the falling walls is something wonderful, and they never hesitate to risk their lives for a very trifle.

In Central America disasters of this kind invariably cause

many of the inhabitants to emigrate. Men, women, and children form themselves into groups, and travel through the country. They set the drama in which they have taken part to music, and they journey from one village to another, singing the rude verses they have composed, and then sending the hat around. After they have visited the whole of their own country, they cross into the neighboring state, where they are also assured of a profitable tour. Thus for more than a year Honduras and Nicaragua were visited by bands of homeless victims, chanting in monotone the eruption of Lake Criba and the terrible catastrophe of San Jose.

The western half of Nicaragua, including the basin in which lie Lakes Managua and Nicaragua, is a volcanic center, including some of the largest of the twenty-five active cones and craters of Central America. Stretching from northwest to southeast, the string of craters beginning with Coseguina and Viejo reaches well into the lake basin. At the northern end of Lake Managua stands Momotombo, while from the lake itself rises Momotombito. On the northwestern shore of Lake Nicaragua lies the volcano Mombocho, while between the two lakes is the volcano Masaya. Near the center of Lake Nicaragua are the two volcanoes of Madera and Omotepe.

Since 1835 there have been six eruptions in Nicaragua, one of them, in 1883, being an outbreak in the crater of Omotepe in Lake Nicaragua, the route of the proposed Nicaraguan canal. The Coseguina eruption, the uproar of which was heard more than 1,000 miles away, threw the headland upon which it stands 787 feet out into the sea, and rained ashes and pumice-stone over an area estimated at 1,200,000 square miles.

Like all Spanish towns in America, San Salvador, capital of the republic of that name, covers a large area in proportion to its population. The houses are low, none of them having more than one story, while the walls are very thick in order to be capable of resisting earthquakes. Inside each house of the better class is a courtyard, planted with trees, generally

having a fountain in the center. It was to these spacious courtyards that, in 1854, many of the inhabitants of San Salvador owed their lives, as they found in them a refuge from their falling houses. On the night of April 16, the city was reduced to a heap of ruins, only a single public building and very few private ones having been left standing. Nearly 5,000 of the inhabitants were buried in the ruins. There was a premonitory shock before the great one, and many took heed of its warning and escaped to places of safety, otherwise the loss of life would have been even more terrible.

Guatemala was visited with a series of almost daily tremors from the middle of April to the middle of June, 1870. The most severe shock was on the 12th of June and was sufficiently powerful to overthrow many buildings.

The republic of San Salvador was again visited by a great earthquake in October, 1878. Many towns, such as Incuapa, Guadeloupe, and Santiago de Marie, were almost totally destroyed, and many lives were lost. The shock causing the most damage had at first a kind of oscillatory movement lasting over forty seconds and ending in a general upheaval of the earth; the result being that solid walls, arches, and strongly braced roofs, were broken and severed like pipe-stems. In the vicinity of Incuapa a number of villages disappeared entirely.

The mountainous region of Mexico is highly volcanic, and earthquakes are of frequent occurrence. Very few of them, however, in the historic period, have occasioned great loss of either life or property. One of the most disastrous occurred in January, 1835, when the town of Acapulco was totally destroyed. In April, ten years later, the City of Mexico was much shaken. Considerable damage was done to buildings, especially to churches and other edifices of large size, several of which were reduced to ruins. The loss of life was limited to less than twenty. Probably the most serious convulsion the country has experienced was in 1858, when shocks were felt over almost all the republic, causing many deaths, and destroy-

ing much property. Over 100 people lost their lives on May 11 and 12, 1870, when the city of Oaxaca was visited by a succession of severe shocks, which tore down many buildings. Since this time Mexico has been free from convulsions of any great magnitude, although slight earth tremors are of frequent occurrence in different parts of the country.

Mexican volcanoes, likewise, are famous for their size, though of late years no great eruptions have occurred. There are many isolated peaks, all of volcanic origin, of which Orizaba, with a height of 18,314 feet, and Popocatepetl, 17,300 feet, the most renowned, are both active. The latter has one crater 5,000 feet in diameter. From the summit the Pacific Ocean and the Gulf of Mexico are both visible.

This crater has not erupted for many years, but in former times it threw its ashes a distance of sixty miles. One can descend into its depths fully 1,000 feet, and view its sulphur walls, hung with stalactites of ice, or see its columns of vapor spouting here and there through crevices that extend down into the interior of the earth. In the ancient Aztec and Toltec mythology of Mexico, this was the Hell of Masaya.

Nowadays great sulphur mines on the peak bring profit to the owners, and ice is quarried from the same vicinity to supply the neighboring city of Puebla.

CHAPTER XXXIII

CHARLESTON, GALVESTON, JOHNSTOWN — OUR AMERICAN DISASTERS

BY TRUMBULL WHITE.

Earthquake Shock in South Carolina—Many Lives Lost in the Riven City — Flames Follow the Convulsion — Galveston Smitten by Tidal Wave and Hurricane—Thousands Die in Flood and Shattered Buildings—The Gulf Coast Desolated—Johnstown, Pennsylvania, Swept by Water from a Bursting Reservoir—Scenes of Horror—Earthquakes on the California Coast.

OUR own land has experienced very few great convulsions of nature. True, there have been frequent earthshocks in California, and all along the Western coast, and occasionally slight tremors have been felt in other sections, but the damage done to life and property has been in almost every instance comparatively light. The only really great disaster of this class that has been recorded in the United States since the white man first set his foot upon the soil, occurred in 1886, when the partial destruction of Charleston, South Carolina, was accomplished by earthquake and fire.

On the morning of August 28, a slight shock was felt throughout North and South Carolina, and in portions of Georgia. It was evidently a warning of the calamity to follow, but naturally was not so recognized, and no particular attention was paid to it. But on the night of August 31, at about ten o'clock, the city was rent asunder by a great shock which swept over it, carrying death and destruction in its path.

During the night there were ten distinct shocks, but they were only the subsiding of the earth-waves. The disaster was wrought by the first. Its force may be inferred from the fact

that the whole area of the country between the Atlantic coast and the Mississippi river, and as far to the north as Milwaukee, felt its power to a greater or lesser degree.

Charleston, however, was the special victim of this elemental destruction. The city was in ruins, two-thirds of its houses were uninhabitable. Railroads and telegraph lines were torn up and destroyed. Fires burst forth in different sections of the city, adding to the horror of the panic-stricken people. Forty lives were lost, over 100 seriously wounded were reported, and property valued at nearly $5,000,000 was destroyed.

A writer in the Charleston News and Courier gave a vivid account of the catastrophe. Extracts from his story follow:

"It is not given to many men to look in the face of the destroyer and yet live; but it is little to say that the group of strong men who shared the experiences of that awful night will carry with them the recollection of it to their dying day None expected to escape. A sudden rush was simultaneously made for the open air, but before the door was reached all reeled together to the tottering wall and stopped, feeling that hope was vain; that it was only a question of death within the building or without, to be buried by the sinking roof or crushed by the toppling walls. Then the uproar slowly died away in seeming distance.

"The earth was still, and O, the blessed relief of that stillness! But how rudely the silence was broken! As we dashed down the stairway and out into the street, already on every side arose the shrieks, the cries of pain and fear, the prayers and wailings of terrified women and children, commingling with the hoarse shouts of excited men. Out in the street the air was filled with a whitish cloud of dry, stifling dust, through which the gaslights flickered dimly. On every side were hurrying forms of men and women, bareheaded, partly dressed, many of whom were crazed with fear and excitement. Here a woman is supported, half fainting, in the arms of her hus-

band, who vainly tries to soothe her while he carries her to the open space at the street corner, where present safety seems assured; there a woman lies on the pavement with upturned face and outstretched limbs, and the crowd passes her by, not pausing to see whether she be alive or dead.

"A sudden light flares through a window overlooking the street, it becomes momentarily brighter, and the cry of fire resounds from the multitude. A rush is made toward the spot. A man is seen through the flames trying to escape. But at this moment, somewhere—out at sea, overhead, deep in the ground—is heard again the low, ominous roll which is already too well known to be mistaken. It grows louder and nearer, like the growl of a wild beast swiftly approaching his prey. All is forgotten in the frenzied rush for the open space, where alone there is hope of security, faint though it be.

"The tall buildings on either hand blot out the skies and stars and seem to overhang every foot of ground between them; their shattered cornices and coping, the tops of their frowning walls, appear piled from both sides to the center of the street. It seems that a touch would now send the shattered masses left standing, down upon the people below, who look up to them and shrink together as the tremor of the earthquake again passes under them, and the mysterious reverberations swell and roll along, like some infernal drumbeat summoning them to die. It passes away, and again is experienced the blessed feeling of deliverance from impending calamity, which it may well be believed evokes a mute but earnest offering of mingled prayer and thanksgiving from every heart in the throng."

One of the most awful tragedies of modern times visited Galveston, Texas, on Saturday, September 8, 1900. A tempest, so terrible that no words can adequately describe its intensity, and a flood which swept over the city like a raging sea, left death and ruin behind it. Sixty-seven blocks in a thickly populated section of the city were devastated, and not

a house withstood the storm. The few that might have held together if dependent upon their own construction and foundations, were buried beneath the stream of buildings and wreckage that rushed west from the Gulf of Mexico, demolishing hundreds of homes and carrying the unfortunate inmates to their death.

A terrific wind, which attained a velocity of from 100 to 120 miles an hour, blew the debris inland and piled it in a hill ranging from ten to twenty feet high. Beneath this long ridge many hundred men, women, and children were buried, and cattle, horses and dogs, and other animals, were piled together in one confused mass.

The principal work of destruction was completed in six short hours, beginning at three o'clock in the afternoon and ending at nine o'clock the same night. In that brief time the accumulations of many a life time were swept away, thousands of lives went out, and the dismal Sunday morning following the catastrophe found a stricken population paralyzed and helpless.

Every hour the situation changed for the worse, and the mind became dazed midst the gruesome scenes. The bodies of human beings, the carcasses of animals, were strewn on every hand. The bay was filled with them. Like jelly-fish, the corpses were swept with the changing tide. Here a face protruded above the water; there the foot of a child; here the long, silken tresses of a young girl; there a tiny hand, and just beneath the glassy surface of the water full outlines of bodies might be seen. Such scenes drove men and women to desperation and insanity. A number sought freedom in the death which they fought so stoutly. A young girl, who survived to find mother, father and sisters dead, crept far out on the wreckage and threw herself into the bay.

During the storm and afterward a great deal of looting was done. Many stores had been closed, their owners leaving to look after their families. The wind forced in the windows,

and left the goods prey for the marauders. Ghouls stripped the dead bodies of jewelry and articles of value. Captain Rafferty, commanding the United States troops in the city, was asked for aid, and he sent seventy men, the remnant of a battery of artillery, to do police duty. Three regiments were sent from Houston and the city was placed under martial law. Hundreds of desperate men roamed the streets, crazed with liquor, which many had drunk because nothing else could be obtained with which to quench their thirst. Numberless bottles and boxes of intoxicating beverages were scattered about and easy to obtain.

Robbery and rioting continued during the night, and as the town was in darkness, the effort of the authorities to control the lawless element was not entirely successful. Big bonfires were built at various places from heaps of rubbish to enable troops the better to see where watchfulness was needed. Reports said that more than 100 looters and vandals were slain in the city and along the island beach.

The most rigid enforcement of martial law was not able to suppress robbery entirely. Thirty-three negroes, with effects taken from dead bodies, were tried by court-martial. They were convicted and ordered to be shot. One negro had twenty-three human fingers with rings on them in his pocket.

An eye-witness of the awful horror said: "I was going to take the train at midnight, and was at the station when the worst of the storm came up. There were 150 people in the depot, and we all remained there for nine hours. The back part of the building blew in Sunday morning and I returned to the Tremont house. The streets were literally filled with dead and dying people. The Sisters' Orphan Hospital was a terrible scene. I saw there over ninety dead children and eleven dead Sisters. We took the steamer Allen Charlotte across the bay, up Buffalo bay, over to Houston in the morning, and I saw fully fifty dead bodies floating in the water. I saw one dray with sixty-four dead bodies being drawn by four

horses to the wharves, where the bodies were unloaded on a tug and taken out in the gulf for burial."

Mr. Wortham, ex-secretary of state, after an inspection of the scene, made this statement: "The situation at Galveston beggars description. Fully seventy-five per cent. of the business portion of the town is wrecked, and the same percentage of damage is to be found in the residence district. Along the wharf front great ocean steamers have bodily dumped themselves on the big piers, and lie there, great masses of iron and wood that even fire cannot totally destroy. The great warehouses along the water front are smashed in on one side, unroofed and gutted throughout their length; their contents either piled in heaps or along the streets. Small tugs and sailboats have jammed themselves into buildings, where they were landed by the incoming waves and left by the receding waters.

"Houses are packed and jammed in great confusing masses in all the streets. Great piles of human bodies, dead animals, rotting vegetation, household furniture, and fragments of the houses themselves, are piled in confused heaps right in the main streets of the city. Along the Gulf front human bodies are floating around like cordwood."

As time passed on the terrible truth was pressed home on the minds of the people that the mortality by the storm had possibly reached 8,000, or nearly one-fourth of the entire population. The exact number will never be known, and no list of the dead could be accurately made out, for the terrible waters carried to sea and washed on distant and lonely shores many of the bodies. The unknown dead of the Galveston horror will forever far surpass the number of those who are known to have perished in that awful night, when the tempest raged and the storm was on the sea, piling the waters to unprecedented heights on Galveston island.

One of the great catastrophes of the century in the United States was the flood that devastated the Conemaugh valley in

Pennsylvania, on May 31, 1889. Though the amount of property destroyed was over $10,000,000 worth, this was the slightest element of loss. That which makes the Johnstown flood so exceptional is the terrible fact that it swept away half as many lives as did the battle of Gettysburg, one of the bloodiest of the Civil War, and transformed a rich and prosperous valley for more than twenty miles into a vast charnel-house.

Johnstown is located on the Pennsylvania Railroad, seventy-eight miles southeast of Pittsburg, and was at the time mentioned a city of about 28,000 inhabitants. It was the most important of the chain of boroughs annihilated; and as such has given the popular title by which the disaster is known. The Conemaugh valley has long been famous for the beauty of its scenery. Lying on the lower western slope of the Alleghany mountains, the valley, enclosed between lofty hills, resembles in a general way an open curved hook, running from South Fork, where the inundation first made itself felt, in a southwesterly direction to Johnstown, and thence sixteen miles northwest to New Florence, where the more terrible effects of the flood ended, though its devastation did not entirely cease at that point.

A lateral valley extends about six miles from South Fork in a southeasterly direction, at the head of which was located the Conemaugh Lake reservoir, owned and used as a summer resort by the South Fork Hunting and Fishing Club of Pittsburg. In altitude this lake was about 275 feet above the Johnstown level, and it was about two and one-half miles long and one and one-half miles in its greatest width. In many places it was 100 feet deep, and it held a larger volume of water than any other reservoir in the United States. The dam that restrained the waters was nearly 1,000 feet in length, 110 feet in height, ninety feet thick at the base, and twenty-five feet wide at the top, which was used as a driveway.. For ten years or more this dam was believed to be a standing menace to the Conemaugh valley in times of freshet, though

fully equal to all ordinary emergencies. With a dam which was admitted to be structurally weak and with insufficient means of discharging a surplus volume, it was feared that it was only a matter of time before such a reservoir, situated in a region notorious for its freshets, would yield to the enormous pressure and send down its resistless waters like an avalanche to devastate the valley.

This is precisely what it did do. A break came at three o'clock in the afternoon of May 31, caused by protracted rains, which raised the level of the lake. Men were at once put to work to open a sluice-way to ease the pressure, but all attempts were in vain. Two hours before the break came the threatened danger had been reported in Johnstown, but little attention was paid to it, on the ground that similar alarms had previously proved ill-founded. There is no question that ample warning was given and that all the people in the valley could have escaped had they acted promptly.

When the center of the dam yielded at three o'clock, it did so in a break of 300 feet wide. Trees and rocks were hurled high in the air, and the vast, boiling flood rushed down the ravine like an arrow from a bow. It took one hour to empty the reservoir. In less than five minutes the flood reached South Fork, and thence, changing the direction of its rush, swept through the valley of the Conemaugh. With the procession of the deluge, trees, logs, debris of buildings, rocks, railroad iron, and the indescribable mass of drift were more and more compacted for battering power; and what the advance bore of the flood spared, the mass in the rear, made up of countless battering rams, destroyed.

The distance from Conemaugh lake to Johnstown, something over eighteen miles, was traversed in about seven minutes; and here the loss of life and the damage to property was simply appalling. Survivors who passed through the experience safely declare its horrors to have been far beyond the power of words to narrate. After the most thorough possible

CHAPTER XXXIV

ST. PIERRE, MARTINIQUE, ANNIHILATED BY A VOLCANO

BY TRUMBULL WHIT

Fifty Thousand Men, Women and Children Slain in an Instant—The Island Capital Obliterated—Molten Fire and Suffocating Gases Rob Multitudes of Life—Death Reigns in the Streets of the Stricken City—The Governor and Foreign Consuls Die at their Posts of Duty—Burst of Flame from Mount Pelee Completes the Ruin—No Escape for the Hapless Residents in the Fated Town—Scenes of Suffering Described—St. Pierre the Pompeii of Today—Desolation over All—Few Left to Tell the Tale of the Morning of Disaster.

BEHOLD a peaceful city in the Caribbean sea, beautiful with the luxuriant vegetation of a tropic isle, happy as the carefree dwellers in such a spot may well be, at ease with the comforts of climate and the natural products which make severe labor unnecessary in these sea-girt colonies. Rising from the waterfront to the hillsides that lead back toward the slopes of Mount Pelee, St. Pierre, metropolis of the French island of Martinique, sits in picturesque languor, the blue waves of the Caribbean murmuring on the beaches, the verdure-clad ridges of the mountain range forming a background of greenery for the charming picture. Palms shade the narrow, clean, white, paved streets; trade goes on at the wharves; the people visit in social gaiety, dressed in white or bright-colored garments, as is the fashion in these islands, where somberness seldom rules; all the forms of life are cheerful, light-hearted, even thoughtless.

Suddenly a thrall of black despair is cast over the happy island. The city of pleasure becomes one great tomb. Of its 30,000 men, women and children, all but a few are slain. The Angel of Death has spread his pall over them, a fiery breath has smitten them, and they have fallen as dry stubble before the sweep of flame. A city is dead. An island is desolate. A world is grief-stricken.

And what was the awful power of evil that robbed of life 50,000 in city and neighboring villages almost in a moment? It was this verdure-clad Mount Pelee, their familiar sentinel, in the shade of whose sheltering palms they had built their summer resorts or found their innocent pleasures. It was this shadowing summit, now suddenly become a fiery vent through which earth's artilleries blazed forth their terrible volleys of molten projectiles, lava masses, huge drifts of ashes, and clouds of flaming, noxious, gaseous emanations to suffocate every living thing. Nothing could withstand such a bombardment from the exhaustless magazines within the vast chambers of the planet, no longer kindly Mother Earth, benign in the beauty of May-time, but cruel, relentless, merciless alike to all.

St. Pierre and the island of Martinique are no strangers to destructive earthquakes and volcanic eruptions. In August, 1767, an earthquake killed 1,600 persons in St. Pierre. In 1851 Mount Pelee threatened the city with destruction. St. Pierre was practically destroyed once before, in August, 1891, by the great hurricane which swept over the islands. The harbor of St. Pierre has been a famous one for centuries. It was off this harbor on April 12, 1782, that Admiral Rodney's fleet defeated the French squadron under the Comte de Grasse and wrested the West Indies from France.

St. Pierre was the largest town and the commercial center of the island. It was the largest town in the French West Indies, and was well built and prosperous. It had a population of about 30,000. It was divided into two parts, known as the upper and lower towns. The lower town was compact with

narrow streets, and unhealthy. The upper town was cleaner, healthier, and handsomely laid out. There was in the upper town a botanical garden and an old Catholic college, as well as a fine hospital.

Mount Pelee, the largest of the group of volcanic mountains, is about 4,400 feet high. It had long been inactive as a volcano, although in August, 1851, it had a violent eruption. It is in the northwestern end of the island, and near the foot of its western slope, fronting the bay, St. Pierre was built.

The Consuls resident at St. Pierre were: For the United States, T. T. Prentis; Great Britain, J. Japp; Denmark, M. E. S. Meyer; Italy, P. Plissonneau; Mexico, E. Dupie; Sweden and Norway, Gustave Borde. There were four banks in the city—the Banque de la Martinique, Banque Transatlantique, Colonial Bank of London, and the Crédit Foncier Colonial. There were sixteen commission merchants, twelve dry-goods stores, twenty-two provision dealers, twenty-six rum manufacturers, eleven colonial produce merchants, four brokers, and two hardware dealers.

The whole area of the island, near 400 square miles, is mountainous. Besides Mount Pelee, there are, further south and about midway of the oval, the three crests of Courbet, and all along the great ridge are the black and ragged cones of old volcanoes. In the section south of the deep bay there are two less elevated and more irregular ridges, one running southeast and terminating in the Piton Vauclin, and the other extending westward and presenting to view on the coast Mounts Caraibe and Constant.

The mountainous interior is torn and gashed with ancient earthquake upheavals, and there are perpendicular cliffs, deep clefts and gorges, black holes filled with water, and swift torrents dashing over precipices and falling into caverns—in a word, all the fantastic savagery of volcanic scenery, but the whole covered with the rich verdure of the tropics.

The total population of the island was reckoned at 175,000,

of whom 10,000 were whites, 15,000 of Asiatic origin, and 150,000 blacks of all shades from ebony to light octoroon.

Martinique has two interesting claims to distinction in that the Empress Josephine was born there and that Mme. de Maintenon passed her girlhood on the island as Franciose d'Aubigne. At Fort de France there is a marble statue of the Empress Josephine.

It was just before eight o'clock on the morning of Thursday, May 8, 1902, that the lava and gases of the crater of Mount Pelee burst their bounds and bore destruction to the fated city. Within thirty seconds perhaps 50,000 persons were killed, and the streets of St. Pierre were heaped with dead bodies, soon to be incinerated or buried in the ashes that fell from the fountain of flame. Within ten minutes the city itself had disappeared in a whirling flame vomited from the mountain, though for some hours the inflammable portions of the buildings continued to burn, until all was consumed that could be. The volcano whose ancient crater for more than fifty years had been occupied by a quiet lake in which picnic parties bathed, discharged a torrent of fiery mud, which rolled toward the sea, engulfing everything before it. The city was no more.

St. Pierre was destroyed, not by lava streams and not by showers of red-hot rocks, but by one all-consuming blast of suffocating, poisonous, burning gases. Death came to the inhabitants instantly. It was not a matter of hours or minutes. It was a matter of seconds. They did not burn to death. They died by breathing flame and their bodies were burned afterward. It is not merely true that no person inside the limits of the town escaped, but it is probably a literal fact that no person lived long enough to take two steps toward escape. These facts will go on record as the most astounding in the history of human catastrophes.

The manner of the annihilation of St. Pierre is unique in the history of the world. Pompeii was not a parallel, for Pompeii was eaten up by demoniac rivers of lava, and lava

became its tomb. But where St. Pierre once stood there is not even a lava bed now. The city is gone from the earth.

The half-dead victims who escaped on the Roddam or were brought away by the Suchet, talked of a "hurricane of flame" that had come upon them. That phrase was no figure of speech, but a literal statement of what happened.

When the first rescue parties reached the scene they found bodies lying in the streets of the city—or rather on the ground where streets once were, for in many places it was impossible to trace the line between streets and building sites—to which death came so suddenly that the smiles on the faces did not have time to change to the lines of agony.

That does not mean death by burning, though the bodies had been charred and half-consumed, nor does it mean suffocation, for suffocation is slow. It can mean only that the bath of burning fumes into which the city was plunged affected the victims like a terribly virulent poison when the first whiff of the gases entered their lungs.

There were many of the victims who died with their hands to their mouths. That one motion of the arm was probably the only one that they made before they became unconscious. Others fell to their faces and died with their lips pressed into the earth. There was no time to run, perhaps no time even to cry out, no time to breathe a prayer. It was as St. Pierre had been just dipped into an immense white-hot furnace and then set out to cool. Mount Pelee went sputtering on, but that made no longer any difference. In the city all life was destroyed.

Every combustible thing was burned. Animal bodies, full of moisture, glowed awhile and then remained charred wrecks. Wood and other easily combustible things burned to ashes. On the ground lay the bodies, amidst heaps of hot mud, heaps of gleaming ashes and piles of volcanic stones. That was all.

That St. Pierre and the strip of coast to the north and south of it were burned in an instant was probably due to the first

break in the mountain coming on its western side and immediately above them, though the direction of the wind may have had a little to do with it. In this way one can understand how the mountain resort of Morne Rouge, where about 600 people were staying, escaped annihilation. Rocks and dust and boiling mud fell upon it, no doubt harming it, but they did not destroy it, for it was out of the pathway of the first awful blast.

For days after this most awful of blasts, beginning indeed immediately after the first explosion, Mount Pelee continued sending down lava streams in many directions. They filled the ravines and followed river courses and made their way to the sea. They did great destruction, but most of the inhabitants in their course had some chance at least to escape.

From Le Precheur around the northern end of the island, to Grande Riviere, Macouba, and Grande Anse, directly across the island from St. Pierre, the lava was flowing. Great crevasses opened from time to time in the hills. The earth undulated like waves. Rivers were thrown out of their courses by the change in land levels. In some places they submerged the land and formed lakes. In other places they were licked up by the lava that flowed on them and turned them to steam.

Constant rumblings, thunder and lightning storms made the surroundings so terrible that many persons actually died of fright.

The West Indian newspapers printed just before the day of the great eruption, and received in foreign countries after the catastrophe, serve to give a graphic picture of the situation in St. Pierre as it was before the outer world knew of the threat of danger. To them, and the letters written and mailed to foreign correspondents before the fatal day, we owe the clear idea of what was going on.

The Voice of St. Lucia, printed at Castries, had this story on May 8 of the days preceding the destruction of St. Pierre:

"Mount Pelee began to show signs of uneasiness in the last days of April. On the 3d inst. it began to throw out dense vol-

umes of smoke, and at midnight belched out flames, accompanied by rumbling noises. Flames were again visible at half-past five o'clock the next morning, and similar noises were audible. At the foot of Mount Pelee are the villages of Precheurs and Ste. Philomene. The inhabitants were thrown into great consternation by the sights and sounds, and especially by the darkening of the day by volumes of thick smoke and clouds of ashes, which were falling. There was an exodus from all over the district.

"St. Pierre was on the morning of May 3 covered with a layer of ashes about a quarter of an inch thick, and appeared as if enveloped in a fog. The mountain was wrapped in the smoke which issued from it. The greatest anxiety prevailed, and all business was suspended.

"A very anxious morning was passed on the island May 4. Thanks, however, to a sea breeze, the situation appeared better at eleven o'clock, but as the breeze died away at sunset, ashes again began to fall, and the mountain and its environs presented a most dismal spectacle, causing much alarm as to what the night would bring forth. Nothing happened, however, and on Monday morning May 5, although everything was not quite serene, the aspect was decidedly encouraging. Less excitement was visible.

"At about nine o'clock on the morning of the 6th a private telegram came from Martinique, stating that the Plissonneau family had chartered the steamer Topaze, one of the boats of the Compagnie Girard, and had started for St. Lucia. At about eleven o'clock the Topaze arrived with Mrs. Plissonneau, Mr. and Mrs. Joseph Plissonneau and three children, Mrs. Pierre Plissonneau and child, and others.

"They report that at noon on Monday a stream of burning lava suddenly rushed down the southwestern slope of the mountain, and, following the course of the Riviere Blanche, the bed of which is dry at this season of the year, overwhelmed everything which obstructed its rush to the sea. Estates and

buildings were covered up by the fiery wave, which appeared to rise to a height of some twenty feet over an area of nearly a quarter of a mile. When the torrent had poured itself into the sea, it was found that the Guerin sugar factory, on the beach, five miles from the mountain and two from St. Pierre, was imbedded in lava. The burning mass of liquid had taken only three minutes from the time it was first perceived to reach the sea, five miles away.

"Then a remarkable phenomenon occurred. The sea receded all along the western coast for about a hundred yards and returned with gentle strength, covering the whole of the sea front of St. Pierre and reaching the first houses on the Place Bertin. This created a general panic, and the people made for the hills. Though the sea retired again, without great damage being done ashore or afloat, the panic continued, intensified by terrible detonations, which broke from the mountain at short intervals, accompanied with dense emissions of smoke and lurid flashes of flame.

"This was awful in daylight, but, when darkness fell, it was more terrible still, and, at each manifestation of the volcano's anger, people, in their nightclothes, carrying children, and lighted by any sort of lamp or candle they had caught up in their haste, ran out into the dark streets, wailing and screaming, and running aimlessly about the town.

"The mental strain becoming unendurable, the Topaze was got ready, and the refugees hurriedly went on board and started for St. Lucia. In the afternoon the gentlemen of the party, having placed their families in safety, returned by the Topaze to Martinique.

"In the meantime, telegrams were being sent from Martinique, imploring that a steamer be chartered to bring away terrified people from St. Pierre. But the superintendent of the Royal Mail company, at Barbados, would not allow one of the coasting boats, the only steamer available, to go to Martin-

ique. At a little before five o'clock in the afternoon cable communication was interrupted and remains so."

Martinique mails, forwarded just prior to the disaster, arrived in Paris on May 18. The newspapers printed a number of private letters from St. Pierre, giving many details of events immediately preceding the catastrophe. The most interesting of these was a letter from a young lady, who was among the victims, dated May 3. After describing the aspect of St. Pierre before dawn, the town being lit up with flames from the volcano, everything covered with ashes, and the people excited, yet not panic-stricken, she said:

"My calmness astonished me. I am awaiting the event tranquilly. My only suffering is from the dust which penetrates everywhere, even through closed windows and doors. We are all calm. Mama is not a bit anxious. Edith alone is frightened. If death awaits us there will be a numerous company to leave the world. Will it be by fire or asphyxia? It will be what God wills. You will have our last thought. Tell brother Robert that we are still alive. This will, perhaps, be no longer true when this letter reaches you."

The Edith mentioned was a lady visitor who was among the rescued. This and other letters inclosed samples of the ashes which fell over the doomed town. The ashes were a bluish-gray, impalpable powder, resembling newly ground flour and slightly smelling of sulphur.

Another letter, written during the afternoon of May 3, says:

"The population of the neighborhood of the mountain is flocking to the city. Business is suspended, the inhabitants are panic-stricken and the firemen are sprinkling the streets and roofs, to settle the ashes, which are filling the air."

The letters indicate that evidences of the impending disaster were numerous five days before it occurred.

Still another letter says:

"St. Pierre presents an aspect unknown to the natives. It is a city sprinkled with gray snow, a winter scene without cold.

The inhabitants of the neighborhood are abandoning their houses, villas and cottages, and are flocking to the city. It is a curious pell-mell of women, children and barefooted peasants, big, black fellows loaded with household goods. The air is oppressing; your nose burns. Are we going to die asphyxiated? What has to-morrow in store for us? A flow of lava, rain or stones or a cataclysm from the sea? Who can tell? Will give you my last thought if I must die."

A St. Pierre paper of May 3 announces that an excursion arranged for the next day to Mount Pelee had been postponed, as the crater was inaccessible, adding that notice would be issued when the excursion would take place.

An inhabitant of Morne Rouge, a town of 600 inhabitants, seven kilometers from St. Pierre, who was watching the volcano at the moment of the catastrophe, said that there were seven luminous points on the volcano's side just before it burst

He said that all about him when the explosion came, there was a terrible suction of air which seemed to be dragging him irresistibly toward the mountain in spite of all his resistance. The volcano then emitted a sheet of flame which swept down toward St. Pierre. There was no sharp, distinct roar of explosion as when a great cannon is fired, but only awful jarring rumblings.

He thought that the entire outburst that did all the work of havoc did not last more than thirty seconds. Then there was complete darkness for ten minutes, caused by the dense volumes of sulphurous smoke and clouds of dust and shattered rocks. The entire country all about St. Pierre was turned into a chaotic waste. All the trees were either torn up by the roots or snapped off, to lie level with the ground.

The outlines of the town but imperfectly remained. The tangle of debris was such that after the rescuers came, it was with difficulty that the course of streets could be followed.

In spite of the horrible surroundings, and the universal wave of human sympathy which had been evoked, looting

began almost as soon as relief. As soon as it was possible to land, ghouls began to rob the bodies of the victims. The monsters plied their nefarious trade in small boats. Skimming along the shore they would watch for an opening when troops and rescue parties were elsewhere, then land, grab what they could, and sail away again.

The United States government tug Potomac, while on her way to Fort de France with supplies from San Juan, Porto Rico, overhauled a small boat containing five negroes and a white man. Something in the appearance of the men excited the suspicions of the commander of the Potomac, Lieutenant McCormick, and he ordered them to come on board. When they were searched, their pockets were found to be filled with coin and jewelry. Rings in their possession had evidently been stripped from the fingers of the dead. Lieutenant McCormick placed them all under arrest, and later turned them over to the commander of the French cruiser Suchet for punishment.

Thus it was that no detail of grewsome horror was lacking to make the shocking tale of the destruction of St. Pierre complete.

The hour of the disaster is placed at about eight o'clock. A clerk in Fort de France called up another by telephone in St. Pierre and was talking with him at 7:55 by Fort de France time, when he heard a sudden, awful shriek, and then could hear no more.

"The little that actually happened then can be briefly, very briefly told," says W. S. Merriwether, the New York Herald correspondent. "It is known that at one minute there lay a city smiling in the summer morning; that in another it was a mass of swirling flames, with every soul of its 30,000 writhing in the throes of death. One moment and church bells were ringing joyful chimes in the ears of St. Pierre's 30,000 people—the next the flame-clogged bells were sobbing a requiem for 30,000 dead. One waft of morning breeze flowed over cathe-

dral spires and domes, over facades and arches and roofs and angles of a populous and light-hearted city—the next swept a lone mass of white hot ruins. The sun glistened one moment on sparkling fountains, green parks and fronded palms—its next ray shone on fusing metal, blistered, flame-wrecked squares and charred stumps of trees. One day and the city was all light and color, all gayety and grace—the next its ruins looked as though they had been crusted over with twenty centuries of solitude and silence."

St. Pierre was a vast charnel-house. Skirting for nearly a league the blue waters of the Caribbean, its smoking ruins became the funeral pyre of 30,000, not one of whom lived long enough to tell adequately a story that will stand grim, awful, unforgotten as that of Herculaneum, when the world is older by a thousand years.

St. Pierre was as dead as Pompeii. Most of her people lay fathoms deep in a tomb made in the twinkling of an eye by the collapse of their homes, and sealed forever under tons of boiling mud, avalanches of scoria and a hurricane of volcanic dust.

Over the entombed city the volcano from a dozen vents yet poured its steaming vapors in long, curling wreaths, that mounted thousands of feet aloft, like smoking incense from a gigantic censer above the bier of some mighty dead.

Such was the disaster which burst upon the hapless people of the island of Martinique, while almost at the same moment a sister isle, St. Vincent, was suffering a kindred fate. Similar in natural conditions, these two little colonies of the West Indies, one French and one English by affiliation, underwent the shock of nature's assault and sank in grief before a horror-stricken world.